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Exhibitions.

THE SUPPLIERS to the trade of raw materials such as flavouring essences, fruit juices, essential oils, flours, improvers, yeasts, packing ware, foils, glassware, shop and factory accessories and equipment are faced with a busy month. It is in September that Christmas orders are mostly placed.

The bulk of this business will be transacted at the two great trade exhibitions which are to be held at the Agricultural Hall, Islington, the Confectioners' and Bakers' from the 7th to the 13th, and the Grocers' and Provision Dealers' from the 21st to the 28th. If the extraordinary success of the Second Chocolate and Confectionery Exhibition at Olympia is any indication of what is to be expected at the Agricultural Hall (and we believe it is), then the optimistic reports we have received as we go to press are well founded.

Vitally interesting things to the cereal chemist in particular are to be found at the first of these two great "shows" at Islington.

Cereal Chemistry.

The development of that branch of technical science which concerns itself with flour and bread making, conveniently referred to as "cereal chemistry," is indebted to a brilliant succession of workers in North America and Europe. It is one of the peculiarities of scientists, as a class, that they incline to magnify, rather than to underestimate, whatever credit may be due to their fellow-workers in another country. This is a most admirable quality. We have had the privilege of coming in contact with representatives in practically every department of scientific inquiry at home and abroad, and we do not recollect any exceptions to the rule.

One is, therefore, not surprised to come across a statement made by Dr. Kent-Jones to the effect that most European cereal chemists will agree that in many respects North America has become the real home of cereal chemistry, and that they are under a great obligation to the American Association of Cereal Chemists and its official journal *Cereal Chemistry*. It is, in fact, impossible to over-estimate how much this active organisation has done for the advancement of cereal science all over the world. Its work also has led the way to useful co-operation between American and European workers. Likewise, we, on this side of the Atlantic, must pay generous tribute to the work of the American experimental stations and farms, and to such giants as C. H. Bailey, Swanson, Alsberg, Gortner, and the late Osborne and Snyder.

Britain.

Although America has set the pace, we, in this country, are not so very far behind. We point with pride to the father of scientific bread making, William Jago, who still maintains a keen interest in his subject, and his *Technology of Breadmaking*, although rather old, is still regarded as the classic work by all who are competent to judge. Then there was Humphries, who raised milling from an obscure art to an enlightened science, and there have been many others scarcely less memorable. The present school is made up of young men who reflect in their own specialised researches the remarkable progress that has been made during recent years in the domain of physical chemistry, and more especially in colloid chemistry. The success which has attended the application of basic, scientific principles to the problems of the mill and bakehouse is incontestable proof, if proof is needed in these days, of the supreme importance of pure science in industry.

Of late years the Research Association of the British and Irish Millers has come into existence, under the leadership of Fisher. Reports of the work carried out by the director and his staff take the form of bulletins circulated among members of the Association and papers of more academic interest published in *Cereal Chemistry*. Useful work is being done in the bakery departments attached to the larger

technical institutes in different parts of the country, notably at the National Bakery School, under the direction of Bennion. Then, too, the larger industrial concerns have built up testing, research, and advisory organisations, with which are associated men of international reputation, such as Kent-Jones, Herd, and Fairbrother.

Continental Europe.

In Germany there are names like Mohs, Ritter, and Berliner that are outstanding; and in France, Arpin, Chopin, and Pecaud are worthy successors to the earlier pioneers represented by Fleurent and Girard. At Budapest excellent work is in progress under the direction of Hancozy. No less important is the work being carried out in Denmark by Jörgenson, whose recent pamphlet on flour colour has attracted considerable interest.

Many of the European investigators are devoting much of their time and attention to the diastatic value of flour, most of the work being based upon the suggestions of Rumsey. This is one of the qualities of wheats concerning which the miller must have full information if he is to blend them successfully.

Flour Colour.

Kent-Jones has drawn attention to the fact that in Europe there is a tendency to neglect unduly the protein test. At some American mills two to three hundred tests a day are carried out. Also, that it does not yet seem sufficiently recognised that the evaluation of carotin colour in flour is not sufficient to judge its colour. Tests for bran powder, whether of the ash nature or by the estimation of the deterioration in the colour and brightness of the flour, are of undoubted guidance to those planning mills. More attention will in future be devoted to flour colour determinations, in both carotin and bran colourations.

Flour Evaluation.

Few industries can boast of a more rapid and complete change from an old-fashioned series of hand operations to a highly mechanised system of mass production than the baking industry. In this transition, engineers and practical bakers have played their parts. But economy and uniformity of production are necessary to insure the efficient and economical conversion of flour and other ingredients into bread of standard quality. This is where the chemist steps in, to exercise control over the ingredients, processes, and products, not only in baking, but also in milling.

The evaluation of flour for use in the bakery is the chief control problem of the chemist. After five generations it still remains a complex and puzzling field of study. Much work has been done on the problem of why some flours are "strong" and others "weak," and how "weak" flours may be improved. Probably the most satisfactory method of evaluating a flour is by a controlled baking test. It is not in the strict sense a scientific method, since the interpretation of the results and its application to bakery requirements and conditions must be based on the experience of the operator. There are, however, so many factors involved, and they are so difficult of correlation, that it is doubtful if a practical test of this nature will ever be superseded by more refined tests in the laboratory.

Fermentation Control.

Scientific methods for the determination of the time of fermentation of the dough, so that it may be taken at exactly the right time or stage for make-up, dividing, proofing, and baking into the most satisfactory bread, have not yet been made available to the industry. This is because the fermentation of dough is a highly complex physico-chemical and biological process. In well-equipped plants, temperatures and humidities are controlled in rooms provided with suitable apparatus, and the temperatures best suited to fermentation have been established as the result of experience and confirmed by biochemical study.

Shortening.

There is yet much to learn concerning the relation of shortening to cake and biscuit making. In the volume, grain, and texture of the cake—in other words, in its quality—the consistency of the shortening is extremely important. Something in the consistency plays an important part in the compounding of the cake dough. The shortening chemist has the problem of finding out what the action is, how to produce it, and how to regulate the consistency of his product to get the best results. The same general principles apply to the use of shortenings in pies, pastries, and icings.

Acidity of Dough.

Fisher and Halton, of the Research Association of British Flour Millers, are investigating the relation of hydrogen-ion concentration and buffer value to the baking quality of flour. Jessen-Hansen attempted to show that there was a particular hydrogen-ion concentration (or acidity) at which every flour made its best and largest loaf. Later, Cohn and Henderson stated that the acidity of the dough at the time of baking seems to be the most important variable factor in bread making. On the other hand, Bailey thought it improbable that this is the only factor responsible for the improvement in the baking strength of flour on ageing. Possibly the increased acidity accelerates the activity of the

enzymes of the dough, but, according to Bailey, there is as yet no tangible evidence to prove that acidulation of the dough improves its physical properties in a direction that makes for better bread.

Fisher and Halton have put these views to the test for two flours and reach the conclusion, so far as these flours are concerned, that hydrogen-ion concentration is a factor of little importance in bread making and contributes little or nothing to loaf quality. Many chemical and colloid changes, apart from the production of acid substances, take place in a fermenting dough, and all of them, doubtless, contribute something to the final product. Many of these changes must be of far greater importance as regards their effects on dough and loaf quality than any small change of acidity could ever be.

Wholemeal Bread.

It is a pleasant change to turn from the hysterical clanging of the daily Press, according to which the way to health is paved with wholemeal bread, to the sanity of a well-balanced report of Drs. McChance and Lawrence for the Medical Research Council on "The Carbohydrate Content of Foods." "One should be cautious," concludes the report, "in advising wholemeal bread generally, and wait until careful unbiassed experiments have been done on a sufficient number of men, women, and children. Then only can accurate conclusions be drawn."

It is pointed out that it has yet to be proved that chronic indigestion and constipation have their origin in a deficiency of vitamin B. Moreover, we do not rely on our bread for our sole supply of this vitamin, as we get supplies of this from eggs, vegetables, and seeds. It is emphasised that experiments have often been conducted only on animals or adult males, and that children are very intolerant of high cellulosic diets, and that for some brown bread is far too irritating, even if given with the idea of relieving constipation. Emphasis is also laid on the importance of appetite as a deciding factor in all digestive considerations, and that no one who dislikes a food of improved value should be forced to eat it if its avoidance is possible.

After all, it is not suitable subject-matter for a religious revival or political tub-thumping.

A Baker's Holiday.

"There are very many bakers who do not take an annual holiday," says a contemporary. "Their excuse runs along conventional lines. The first one is that they cannot spare the time, and the second one is that they cannot afford it. Rarely are these excuses true."

Now we know the truth of the matter; at the same time, it seems a pity to give the poor fellow away!

Temperature Control.

Elsewhere we have given a review of the Bulletin (No. 66) issued by the State of Minnesota Department of Agriculture, "Dairy and Food on the Effects of Wheat Drying upon Milling and Baking Properties." It is shown that wheat can be dried without injurious effects, so long as sufficient temperature control is maintained to ensure no overheating in any portion of the wheat. It must be recalled that Kent-Jones in England has recently made an important contribution to our knowledge on the effects of heat upon wheat. He has shown clearly that these effects depend upon time and temperature of heating. The baking quality of the resultant flour passes through three stages—that of no alteration, followed by one of improvement, and finally one in which the baking properties are gradually ruined. The danger of using heat in wheat drying is the risk of entering this third zone, when it is rendered useless for making into a baking flour.

Strong Drinks.

Carl Jones, of Blackstone, has unearthed some interesting points concerning the history and qualities of bottled beverages which he brought out in an essay submitted in an English examination at the Blackstone (Va.) Military Academy. Somehow one cannot conceive of an English essay entitled "Bottled Beverages" being submitted in one of our own military academies, although, in point of fact, it is a vastly more important subject to the modern world than such hackneyed themes as "The Rise and Fall of the Roman Empire" or "The Battle of Waterloo."

Mr. Jones, Junior, quotes an old formula: "Put into ale, Bishop's Wort, lupins, betony the Southern or Italian fennel, nepti, water, agrimony, corbelmarch. Then let the man drink." We should very much like to hear what happens afterwards.

We once heard that an Irish priest refused to have his photograph on bottled soda-water made by an enterprising firm who obtained their water supply from a holy well, but we have never before come across the suggestion, made by Mr. Jones, that an Archbishop of Canterbury originated the idea of drinking "from a bottle through a straw." The old and bedridden Archbishop was unable to take nourishment otherwise than by sipping through a hollow silver pipe.

Food and Drinks.

It is stated that the average half-pint bottle of beverage contains 85·73 per cent. water, whilst hash of "the boarding house standard" contains 80·3 per cent. It also contains 203 calories per pound, whilst butter milk contains about 162 calories. It is clear, therefore, that carbonated beverages are food as well as drink.

The Mellon Institute found that carbon dioxide has a distinct germicidal effect upon bacteria, the magnitude increasing with the pressure of the gas. Scientists inoculated carbonated water with typhoid germs, and discovered that these germs not only ceased their rapid reproduction, but that an actual reduction in the original number took place.

Dr. Edwin E. Slosson, Director of Science Service, Washington, D.C., says: "Bottled Carbonated Beverages are no longer to be regarded as an occasional indulgence, a treat to a girl or relief on an extra hot day. They are becoming a factor of the every-day American dietary. They play the rôle in America that beer does in Germany and wine in Italy. They are now taken with meals and not merely between meals as formerly. They are sit-down drinks as well as stand-up drinks. Formerly they were bought to be taken on picnics; now they are bought to be used at home. They furnish a large part of the energy of the most energetic people on earth."

Beverages as Food.

Dr. Herman N. Bundesen, President of the American Public Health Association, Chicago, says that the base of practically all bottled carbonated beverages is the same and consists of pure sugar syrup acidulated with fruit or phosphoric acid to which is added carbonated water. Other ingredients are added to this base to make the drink pleasing to the taste, sight, and smell. This is done, of course, by combining with it various colouring substances and flavours.

The food value of carbonated beverages is very high, and although most people believe it absurd, they actually contain more food value per pound than some of our most common vegetables and meats. The cane or beet sugar is always wholesome food. It is classed under carbohydrates, and this is one of the best sources of quick energy for the body. There is no one who objects to the use of pure beet or cane sugar as a food for young or old.

Acids in Beverages.

The citric and carbonic acids in these beverages change the sugar into glucose or dextrose. This process starts immediately after bottling and continues rapidly throughout the life of the beverage. These forms of sugar—glucose and dextrose—are the most easily digested of all the forms of sugar and quickly furnish energy and heat to the body.

Next we have the acid present. Citric, tartaric, and phosphoric acids are the ones mainly used in our manufacturing process. These acids have a special place in carbonated beverages and do special work in our bodies. They, instead of increasing acidity, help to lessen the harmful acids in the body.

Gas in Beverages.

Next comes the gas which is contained in a carbonated beverage. Only a small part of this gas enters the body, but the quantity divides into two different places, some remaining in solution in the blood. The remainder is taken up by the mineral elements in the blood to form the compounds known as carbonates.

Under normal conditions the blood never becomes acid. If it should, then we are close to the point of death. This keeping the blood from turning to acid is done by the carbonates and phosphates. Baking soda is one of those present. These compounds are called buffer-substances, and when there is a tendency for the amount of acid to increase, these buffer-substances unite with it to form neutral compounds which are eliminated. Therefore, drinking carbonated beverages helps to maintain alkalinity of the body and fight acidity.

Chocolate in Dietary.

Chocolate being rich in fat, starch, and nitrogen is a valuable food. We know that it contains proteoses and peptones produced from the protein during the fermentation of the bean, as well as alkaloidal nitrogen. Some protein is present; just how much is not definitely known, and we know very little concerning its nature. D. B. Jones, of the Bureau of Chemistry and Soils, found that the protein of cocoa was combined with tannin in a form which he could not extract. Also, we know very little about the chemistry of the alkaloidal compounds in cocoa. Theobromine and caffeine are both present, partly in combination and partly free. Some such combination of the colouring matter exists, but its real nature has never been determined. All we know about the aroma of cocoa is that certain trade practices produce certain results. There is a great field here in a study of the effect of cultural methods upon the aroma of cocoa.

Blanching of Peas.

In the July issue we summarised the conclusions of P. L. Gowen in his paper to the National Canners' Convention on the blanching of peas as follows: "A blanch of 5 minutes at 180 degrees, or 2 to 3 minutes at 205 to 212 degrees, results in a noticeable loss of flavour."

Actually, these were the conditions of the most satisfactory result in blanching. Peas blanched 5 minutes or more at from 205 to 212 degrees showed a noticeable loss of flavour, however It is noteworthy that fewer splits and empty skins were found at 180 degrees than at 206 to 210 degrees, and the longer the blanch at the latter temperatures the more were the splits and empty skins.

Emulsification in the Confectionery and Baking Industries

By EDMUND B. BENNION, M.Sc. TECH., A.I.C.,
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With the development of machinery in the baking industry and the gradual increase in the size of units, new processes have been evolved and a greater control of existing ones established. A discussion of some colloidal problems.

THE MECHANISATION of a productive industry demands a set standard in the finished product, and to this end the control of raw material must be established, together with control of the series of operations involved in its production.

In the endeavour to obtain uniformity in the finished products in both bread and confectionery, emulsification has been introduced in many processes, and the study of different types of emulsions has resulted in certain very marked improvements in many cake-making processes.

There are in the production of bread and confectionery many processes in which emulsification is carried out without the use of the machine known as an emulsifier. This is mentioned to prevent confusion in any reader's mind, since it is the development of the emulsifier which has focussed attention on this important branch of bread making and cake making.

Bread Making.

The production of bread and cake is a colloidal problem, and the only way to tackle it is to consider it from this viewpoint.

Let us consider bread making and the general underlying principles which must be followed in the production of a really satisfactory loaf with a good flavour, good eating and keeping qualities, and of a uniform shape. The flour employed must be suitable for the process in use, and the "strength" of the blend of flour depends entirely on the length of process, the number of other ingredients employed, and the type of bread to be produced. The foundation of the flour is the protein which constitutes the "wet gluten" of the dough.

As soon as the flour and water are mixed together the water is taken up and the protein matter imbibes it, producing the substance which is termed "wet gluten." This forms a kind of network throughout the dough and makes it possible to obtain a coherent mass.

Every kind of flour possesses protein of a somewhat different character, so that no two flours will imbibe the same amount of liquid, and for this reason great care must be taken when the dough is being made to insure that the protein imbibes sufficient water, otherwise it will not be developed satisfactorily as wet gluten and later on not give the best results in the finished product.

Formerly, the matter of dough making was considered to be one of getting the flour and water mixed together, but to-day the development of doughs by mixing machines has received such attention that the importance of this has led to machines being designed so as to bring about the most thorough incorporation of the ingredients.

Dough, being a colloidal complex, can, however, be damaged by too much mechanical action, and this matter is the subject of research at the present moment.

High speed dough-mixing machines are almost universally in use in America, and are being introduced over here, since, by mixing the dough in these at a higher speed for a shorter time, the flour is made capable of taking up more liquor because greater hydration of the protein matter is brought about.

Whilst dough making is a colloidal problem, it may also be regarded as one of emulsification, although the generally accepted idea of emulsification is a system containing two liquid phases. This, however, depends on the thorough and most perfect distribution of a liquid phase (water) in a solid phase (flour), and can be regarded in a somewhat similar light to the study of alloys, for example.

This thorough incorporation of the ingredients at the dough-making stage not only results in a much finer textured dough, but in a finer textured loaf, which has a crumb possessing a softness and silkiness so much desired. Further, the moisture-retaining properties are enhanced, provided that the fermentation process is carried out satisfactorily.

Emulsifying Agents.

In an attempt to retard staleness in bread and eliminate it altogether, emulsions of oil and water were used at dough making, instead of water alone.

It has been customary for many years to use lard as an enriching agent in bread, and it was found that its use resulted in a loaf which possessed a crumb of softer texture and of a greater moisture. This fat was placed in the mixer as a solid piece and distributed by mechanical action of the machine.

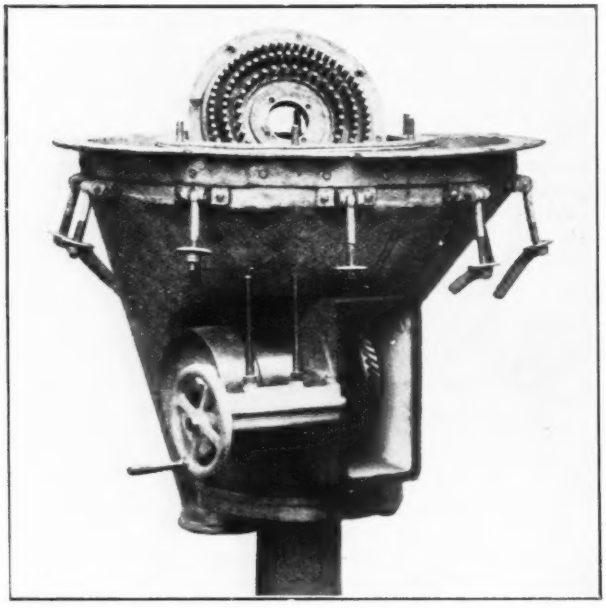
In the original experiments the same quantity of fat was taken and melted and emulsified with water, giving approximately a 2 per cent. emulsion which gave vastly improved results in the dough and bread. Not only was the texture of the bread improved, but the crust had a most pleasing biscuit-like appearance and taste and the colour of the loaf crumb was very much superior.

This led to many experiments, and as a result there are many large bakeries to-day making their own emulsions of fats and milk and using them in the production of fine quality bread. Working on a commercial scale, the question of the stability of emulsions immediately arose, and in order to overcome this milk powder was used, since the milk functioned

as a protective colloid, rendering the emulsion stable for about twenty-four hours. As a result, all the bread in which these emulsions are used is virtually milk bread.

Cake Making.

In cake making large quantities of eggs, sugar, and fat are used with flour in varying quantities, depending on the nature and quality of the cake. Thorough distribution of the ingredients to produce a homogeneous mass is essential, so that there is obtained disperse colloidal systems varying slightly in composition, using each different formula for the particular mixes.



A Type of Emulsifier Widely Used in the Confectionery Trade

(By courtesy of the Buffoline Noiseless Gear Co., Ltd.)

Taking the production of cake, by which we mean slab cakes and similar block cake, the older method employed was one in which in the first stages a water in oil emulsion was produced, the liquid phase being of a small order which was increased at a later stage. Whilst this process of emulsification is being carried out, a complete solution of some of the ingredients takes place, so that when the flour is finally added some of the protein matter is found to be soluble, as a result of which a tough glutenous dough does not result, unless too much mixing is carried out at the wrong time. This results in a nice eating cake.

With the cheaper varieties of cake, now so largely sold, a quantity of milk has to be used, and where the quantity of fat used is not very great then it can be emulsified with the milk and used in this form for cake making. Much of the cheaper types of cake are made in this way, employing an oil in water emulsion, which is later converted into the equivalent of an oil in water, only with flour replacing oil. This results in a cake of much finer and more uniform texture and a very regular general appearance.

In cake making and pastry making, oils and fats are used to bring about a mechanical hindrance and prevent the formation of coarse shreds of gluten. Sugar also plays an important part as a "shortening" agent by its solvent action on the gluten. It follows, then, that the more thoroughly these so-called shortening agents can be distributed among the other ingredients, the greater their shortening action. Up to a certain point this is found to be the case where emulsions are in use. Under certain conditions, however, where the quantity of oil or fat is small, the use of this oil, emulsified with milk, has a modifying effect on the gluten, rendering it softer and more plastic. This is reflected in the finished cakes by a uniformity of texture and general evenness of appearance.

So much for the principles of emulsification in big cake making, although no mention has been made of the added benefits which are derived apart from texture and shape. These, however, will be considered later.

Pastry Making.

There are many products made by the confectioner in which chemical aerating agents are used, and in which the quantity of fat used per pound of flour is small. For products such as rock cakes, rice buns, scones of all kinds, and similar products, great advantages have been derived from the use of an emulsion of milk and fat, and for this purpose a stock emulsion is made up containing approximately 33 per cent. of oil. The use of this not only improves the general appearance and volume, but renders the goods more palatable because they retain their freshness for a longer period.

Many bakers now make their own cream—now termed "Artificial Cream" by Act of Parliament. This became necessary on the prohibition of boric preservatives, and it has proved to be highly beneficial to the trade since it is now possible to make a cream of a definite butter fat standard which will whip easily as required, and which, when used in cake decoration or production, will keep in the finished product for a reasonable length of time. Further, an emulsifier enables the baker to vary the butter fat content of his cream with the changing weather conditions—an important thing in a large business. The majority of people use butter in making their cream, although there are some who use a high-class margarine, especially where the price obtainable for the finished cake is not the same as that for a product containing real cream.

Emulsified Cream.

In the production of artificial or emulsified cream many difficulties have had to be overcome in many cases by the majority of those using the machines. The stability of the cream has been an especial source of trouble to many producers of it. As a result of data obtained from different sources, it has been found that in many cases the cause of instability has not been in the ingredients employed, but the speed of the motor driving the emulsifier. We know the

speed of all motors varies, and sometimes very considerably, so that it has become necessary in some cases to install somewhat larger motors in order to obtain a sufficiently high safety factor when allowing for speed variations due to a fluctuating current. In other cases the use of butter which was not as fresh as it should have been, with a rather higher acidity than normal, has affected the stability. When the cream was produced the next difficulty was whipping this for use in cake decoration and fillings. Some people maintained that cream could be whipped immediately it came off the machine. And in the majority of cases it could, but the bulk of the whipped cream was not so great as when fresh cream was used. As a result of many experiments it was found that if the cream was stored at 40° to 45° F. for twelve hours, the cream could be whipped with ease and gave a good, bulky product equal to that obtained with fresh cream.

Because of the reliability and keeping qualities of such cream, which is produced under sterile conditions—since all the products are subjected to the temperature of 145° F. before going through the emulsifier, that is, the temperature of pasteurisation—it is now finding a very extensive use in confectionery. When so prepared it cannot be detected from fresh cream when used in the cakes.

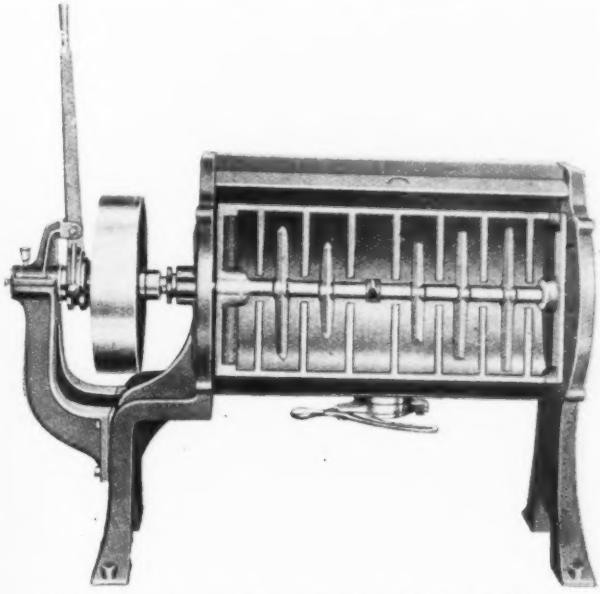
Much attention has had to be paid to flavour, and, in order to obtain this, all the ingredients have to be of the best and the temperature of working must be carefully controlled.

Salad Dressings.

Besides the production of cream in the emulsifiers, many other products in the way of cream fillings are being tried out with very satisfactory results, whilst existing methods of manufacture are being modified. For example, fillings for custard tarts give more satisfactory results if to them a little butter is added and the mix passed through the emulsifier.

For the production of mayonnaise dressings and salad creams an emulsifier is essential, and permits many people who do considerable amounts of catering to make up their own special mixes and at the same time make the most out of their machines.

An attempt has been made to cover some of the phases of work in the bakery in which emulsification enters and plays an important part. It shows that with the progress which is now being made the old rule-of-thumb methods are giving place to scientific methods. Further, the approach to all problems must be of an experimental nature, and to-day problems are being attacked in this light and, with the greater knowledge, old methods scrapped in favour of new ones, which give greater uniformity of products. It is possible as a result to establish greater control in the bakehouse.



Marshmallow Beater, Steam Heated, with Coil, 100 lbs. Pressure—3 H.P.

(By courtesy of Messrs. Brierley, Collier and Hartley Ltd.)

DEFINITION OF pH IS OF INTEREST

THE symbol pH has come to have important significance in many branches of the food industry. It refers to the control of acidity in industries in which what might be called the "active acidity" is of importance. Examples are found in fermentation, dyeing, tanning, laundering, baking, and in the manufacture of sugar, sweets, gelatin, and paints.

The active acidity of a solution is often but a small fraction of its total acidity, and the fact that strawberries usually taste more sour than tomatoes indicates that they have a higher active acidity; yet the total acidity of tomato juice, as measured by the amount of soda required to neutralise it, is often higher than that of strawberry juice.

The symbol pH is derived from "potential of hydrogen," since the most accurate method for determining the active acidity employs an electrometric apparatus, with a hydrogen electrode. As active acidity falls off, the pH increases, one unit for each tenfold decrease of acidity. Thus a pH of 5 means but 10 per cent. of the active acidity of a pH of 4, and but 1 per cent. of that of a pH of 3. Neutral solutions have a pH of 7, and alkaline solutions greater than 7. Human blood normally has a pH of about 7·5, which is faintly alkaline.

Old methods for determining active acidity have been largely replaced by more convenient though less accurate methods that take note of the colours presented by standard indicators in the solutions to be tested. The result has been the employment of determinations of active acidity—that is, of pH—in many industries that were formerly content with determinations of total acidity. In the refining of cane sugar and glucose pH control has resulted in superior products and increased yields. The consistency of certain confectionery products is dependent on the active acidity during the boiling operation, and thus calls for pH control. Fruit juices will jell over a large range of total acid content, but only within a very narrow pH range.

The Energy Value of Confectionery

RECENT EXPERIMENTS IN PHILADELPHIA UNIVERSITY

A cure for the mid-afternoon feeling of lassitude is announced by Dr. T. L. Bolton, head of the Department of Psychology, Temple University, Philadelphia, who has just completed a research investigation designed to discover the reason and remedy for this widespread business disease.

THE INVESTIGATION has shown that the physical and mental let-down which frequently occurs during the busiest period of the office day is to a considerable extent due to insufficient or improperly balanced diets and can be largely, if not wholly, prevented by the timely eating of foods which, in small volume, act as quick fuel for the body engine. Foods having a high sugar content were selected as best filling this requirement.

The Method.

Twenty feminine office workers, divided into four groups of five girls each, were put through an elaborate series of tests of their working capacity by Dr. Bolton, assisted by Dr. Louise Hamilton, Dr. Hamilton, Dr. Smeltzer, and Dr. Harter, of the Department of Psychology in Temple University. The tests were given at 9.30 in the morning and at 2.30 and 4.30 in the afternoon. The duration of the investigation was four weeks.

Five of the girls, the "full-food group," were supplied each afternoon with a light meal consisting of cake, candy, and sweetened orangeade. Two "mixed-food groups" were supplied with the repast on designated days, skipping it on others. The fourth group, known as the "control group," went through the tests without partaking of the additional meal.

The selection of foods having a high sugar content is explained by Dr. Bolton as being due to the fact that sugar is one of the most highly concentrated and quickly digested of all the carbohydrates, or energy foods. Speedily absorbed by the system, it becomes a source of immediate energy to sustain work and its effects are readily apparent to the trained investigator equipped with the necessary laboratory instruments.

The Curve of Work.

It is reported that all the girls showed marked practice gains as they became familiar with the tests. Aside from practice gains the "control group" showed the typical curve of work—a low beginning, rising to a maximum at about 2.30 and falling toward the close of the day, with the exception of a brief spurt at the end.

In the case of the "mixed-food groups," when the girls were supplied with the additional meal as frequently as four times in the week, work appears to have fallen in with that of the "full-food group." Tabulated summaries of the tests given to members of the latter group show that they were sustained at a higher working rate than the girls in the "control group." Their practice gains were continued up to the last and were greater and more consistent than the gains of the "control group."

The investigation has shown positive results in favour of small quantities of concentrated food taken in mid-afternoon. Although only dealing with feminine office workers, the findings apply with equal force to the opposite sex. Emphasis should be laid upon the support they give to the opinions of those who have held that reducing diets are responsible for impairing the efficiency of the modern business girl.

As the food supplies within the body approach the point of exhaustion, work power begins to fall. Fatigue sets in, starting up muscular tremblings and lowering the speed and contractile power of the bodily members. Food of a highly concentrated and readily assimilable character acts as a quick restorative of energy and working capacity.

On the basis of these findings, business and professional men and women would do well to keep in the drawer of the desk a box of good sweets or candied fruit. When energy begins to flag in mid-afternoon these quick-action foods act as an emergency ration and supply the calories needed for the rest of the day's work. The sugar in afternoon tea or in sweetened cold drinks will have the same effect.

500,000 Calculations.

Working capacity of the twenty girls chosen for the investigation was determined at each test period by delicately adjusted instruments connected with electrically operated recording devices. Their co-ordinated muscular action was measured by the three-hole test, which consists of making electrical contacts by placing a stylus successively in three small holes just large enough to permit the entrance of the stylus. The score made in the test was determined by the time it took to make eighty contacts.

The tapping test was employed for measuring speed and endurance. In this test the girl taps with a stylus at top speed for fifteen seconds upon a metal plate. Five periods of tapping alternate with ten-second rest intervals. Each tap is recorded by an electrical device and the number of taps determines the score. Both hands, one after the other, are tested. Other tests were made to measure mental alertness. The substitution test, for instance, consisted of correctly placing five letters of the alphabet on a chart covered with rows of five different geometric figures. The key was given at the top of the chart. Two minutes were allowed for the completion of the test.

Approximately five hundred thousand calculations were necessary in compiling, tabulating, and comparing the records of the twenty girls. Dr. Bolton will present a report on the investigation before the American Psychological Association.

The Concept of "Colloid" and its Importance for the Food Chemist

By DR. W. CLAYTON

Chief Chemist and Bacteriologist, Messrs. Crosse and Blackwell, Ltd. London.

The first of these articles, "The Scope of Colloid Chemistry," appeared in the August issue. The series will be completed in six parts.

Part II.—Graham's Colloids—Proteins

WHEN GRAHAM coined the word "Colloid," he had in mind gelatin or glue, and gelatin still remains as the key colloid to the class of organic compounds termed proteins. Proteins are of the greatest importance to the food chemist in his studies of meat, fish, milk, bread, table jellies and many other foods. The present article does not pretend to discuss individual proteins in detail, but rather to draw attention to several outstanding general phenomena in colloid chemistry.

Emulsoids.

In the first place, proteins belong to the class of colloids known as Emulsoids, and, secondly, they are Amphoteric Colloids. Both terms are of considerable importance in physical chemistry.

Colloids are classed as suspensoids or emulsoids, mainly on the basis of their affinity for the dispersion medium—water. Suspensoids—*e.g.*, colloidal metals—have little affinity for water, and their physical properties—*e.g.*, viscosity—differ little from those of water. They are sensitive to electrolytes, being readily flocculated, and they carry a definite electric charge, usually negative. Under the ultramicroscope, the particles are traced by their lively Brownian motion. Emulsoids have quite different properties, giving in solution viscous systems with an electric sign frequently depending on the hydrogen-ion concentration prevailing, and requiring considerable amounts of electrolytes to "flocculate" them; "salting-out" seems a better term. The ultramicroscope reveals only a diffuse light cone.

The main differences between suspensoids and emulsoids are the remarkable differences in viscosity of their solutions, and the fact that flocculation salting-out, as a rule, results in irreversible flocculation for suspensoids and reversible for emulsoids when the flocculated colloid is subsequently treated with water. Synonymous terms reflecting the affinity of the colloids for water are hydrophobe for suspensoid, and hydrophile for emulsoid; the class terms are lyophobe and lyophile respectively.

Emulsoids such as gelatin exhibit the phenomena of imbibition of water with consequent swelling. This is a reversible action, as the swollen colloid will give up water when placed in a dry atmosphere, reaching an equilibrium condition fixed by the vapour pressure. Swelling is influenced by the presence of salts and by the pH of the system, and is a minimum at the iso-electric point, to be discussed later.

When gelatin has been allowed to swell in sufficient water, heating thereafter effects solution. On cooling, the solution will set to the familiar jelly or "gel" with marked elasticity. Many theories have been formulated for the structure of gels, but no comprehensive accepted theory being as yet acknowledged, further discussion is here undesirable. One phenomenon, common to elastic gels at certain concentrations, deserves mention—viz., Syneresis. This refers to the peculiar "weeping" or segregation of liquid that occurs when the gels age. Thus 1 per cent. agar-agar gels show syneresis particularly well, a clear liquid separating in a few hours, the liquid being a solution, not pure water. The actual mechanism of syneresis is still in dispute, but its importance in bio-colloid chemistry is undoubted.

Amphoteric Nature of Proteins.

When a protein is in "pure" solution in water, the concentration of colloid ions is small, but on addition of acid or alkali their number rapidly increases. Acids favour the formation of protein cations, alkalis favour protein anions. The phenomenon of the proteins being in solution as ionisable salts whose electrical character is dependent on the hydrogen-ion reaction of the system is inferred in the term "amphoteric," familiar in the chemistry of the amino acids.

At a definite intermediate concentration of hydrogen and hydroxyl-ions, protein cations and anions are present in equal numbers, and the concentration of protein ions is a minimum. The system is now electrically neutral or iso-electric. Each protein iso-electric point has a definite pH fixing this; thus: gelatin (pH 4·7), casein (pH 4·6), gliadin (pH 6·5), glutenin (pH 7·0).

The properties of a protein solution at the iso-electric point reflect in striking fashion the presence of the electrically neutral point. At a maximum are the lowering of the surface tension of the water, the turbidity of the solution, the capacity of alcohol to effect precipitation of the protein. At a minimum are the viscosity, osmotic pressure, electrical conductivity, solution stability, optical rotation.

These facts can best be understood on the assumption that at the iso-electric point the dissolved protein exists as comparatively small particles of difficultly soluble material. The proteins in modern colloid chemistry are considered as polymolecular structures, stabilised by electric charge and/or hydration. The unit protein particle probably consists of many molecules, and those molecules on the external side of the unit determine the electrical character of the protein by their particular reaction with the surrounding aqueous medium.

Modern Processing in Cake and Biscuit Manufacture

The Rôle of Electricity

Messrs. Hughes' New Factory at Birmingham

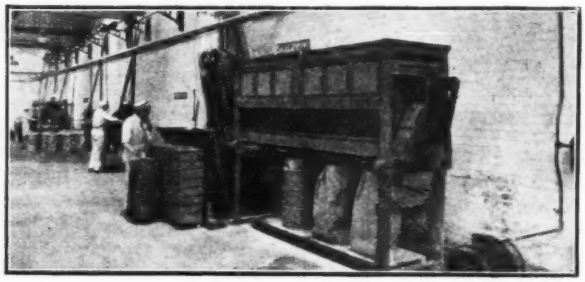


FIG. 1.—Motor of 11 H.P. driving Sugar Mill.

THE BUSINESS of Alfred Hughes and Sons, Limited, has been noted for quality production since its inception nearly fifty years ago, and at the factory recently opened at Adderley Park one may see the complete processes involved in cake and biscuit making right from the preparation of the ingredients to their despatch. The factory site is some ten acres in extent, on which there are four main buildings:

1. Administration offices, raw material store, and preparation rooms, bakery, and packing department.
2. Sale rooms, despatch rooms, and transport department.
3. Engineers' and carpenters' shops.
4. Welfare hall.

Practically all the ingredients are produced within the empire; a large proportion of the sugar is made from English sugar beet, and all the flour is milled from home-grown wheat. In this connection it is interesting to note that not only are the best biscuits made in this country, but only English flour can be used for biscuits of high and consistent quality.

Operating Conditions.

All the machines are driven by electric motors, power being taken from the mains of the Birmingham Corporation at 5,000 volts, 3-phase, 25 cycles, and transformed down to 440 volts for the factory power mains. By utilising the system of individual drive, Messrs. Hughes have been aided in their efforts to obtain a bakery of high efficiency, as well as of notable cleanliness, airiness, and comfortable operating conditions generally. Fig. 1 shows a small section of the raw materials preparation department, the motor driving the sugar grinding machine being of 11 h.p. and running at 1,440 r.p.m. Two other motors in this department are seen in Fig. 2, that on the floor being of 35 h.p., 715 r.p.m., and that on the girders being of 3½ h.p. The former drives flour sifting machines, and the latter elevating plant. These motors, and, in fact, practically all the motors in the installation under consideration, were supplied by the British Thomson-Houston Company, Limited, of Rugby, having been manufactured at this company's Birmingham factory, which is devoted solely to the production of electric motors for industrial requirements. The B.T.H. motor starter for the 35 h.p. motor is situated in a convenient position for the operator, on the far side of the low wall seen in the illustration. It is of the pillar type for floor mounting—a type which is widely favoured in industrial installations on account of the ease of fixing exactly where required and the ready accessibility of all parts for inspection, while the complete system of interlocks and protective features insures safety to both the operator and the machine. These equipments can be arranged for control by push buttons if required, and the fact that any number of push button stations can be provided in the most desirable positions is often of the greatest value.

Mixing and Cutting.

Of the mixing machines for the ingredients of biscuits, the larger are capable of thoroughly incorporating seven to eight hundredweight at each mixing. After this process the biscuit dough is passed through a series of "brakes," which roll it into smooth, long pieces. These are fed into the cutting and stamping machines, which automatically shape, imprint, pattern, and name the biscuits and deposit them on the baking trays. At no stage in the process is the dough touched by hand, and the loaded trays pass direct to the travelling ovens of a modern type. A chain conveyor takes the trays

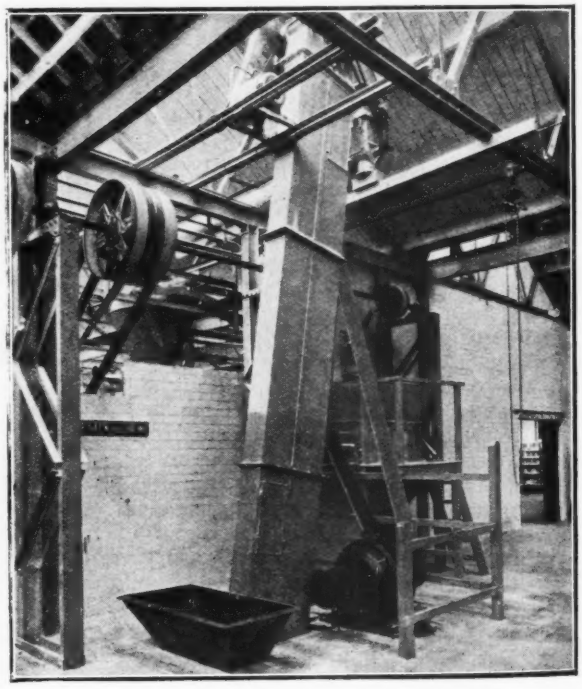


FIG. 2.—Motors of 35 H.P. and 3½ H.P. driving Flour Sifting and Elevating Plant.

through the oven chambers at a speed which can be varied to suit the type of biscuit, each oven having a capacity of between four and five hundredweight per hour. The trays on issuing from the mouth of the oven are automatically transferred to conveyors, which take them to the packers, sufficient time elapsing for the biscuits to cool before they are taken off by girls, who pack them into tins. A view of this equipment is given in Fig. 3, the protecting covers for the electric motors driving the nearest equipment being removed. The motors driving the dough brakes are of 10 h.p., 705 r.p.m., and the motors driving cutting machines of 8 h.p., 710 r.p.m. The component machines of each equipment are arranged in line, the entry to the ovens being shown in the illustration. The necessary speed adjustment of the conveyors is obtained by the use of a variable speed motor in each case.

FIG. 3.—Dough Brakes driven by 10 H.P. Motors, Biscuit Cutting Machines driven by 8 H.P. Motors, and Biscuit Ovens.

Two depositing machines, for the biscuits made by this process, are seen in Fig. 4. These machines are fitted with rollers, so that they can be moved to any position required, and in the illustration both are quite close to the mouth of the oven. The driving motors are of 3 h.p., 700 r.p.m., and 2 h.p., 1,410 r.p.m., respectively, the motors being plugged in by flexible cable at suitable plug points.

Chocolate Coating.

Several varieties of biscuits require decoration, and these are transferred from the last conveyor of the oven system to a special section, and an interesting machine for coating biscuits with chocolate is that seen in Fig. 5. The driving motor is of 2½ h.p., 700 r.p.m. While being slowly conveyed through this machine the biscuits are coated with chocolate in viscous form, and on emerging from this section are further decorated, if this is required, and finally conveyed through a special cooling chamber with the exit in the packing department.

A machine for making ice wafer biscuits in one operation is shown in Fig. 6. It will be seen that this machine is chain driven by a motor of 3 h.p., 685 r.p.m. The process is a continuous one, the batter being sprayed on to the bottom sections of hot moulds, on to which the top sections immediately descend, the moulds then passing through the incorporated oven in such manner that the correct amount of heat is applied to both top and bottom halves of the mould to insure that when the wafers are subsequently automatically ejected they will be correctly baked. This machine, as well as most of those referred to, is by Messrs. Baker Perkins, which firm also supplied the two-tier draw-plate cake ovens illustrated in Fig. 7.

These ovens are electrically heated and are ideal for cake baking, as for this purpose the heat must be easily controlled and maintained at a specific temperature, between narrow limits. To this end the heating elements are provided with B.T.H. automatic control equipment, the desired baking temperature being set by the operator moving an indicator to the corresponding temperature mark on the graduated dial of a temperature indicator. As soon as the current is switched on the temperature of the oven rises until the desired temperature is reached, this temperature being automatically maintained until the operator alters its value. A special sensitive relay is provided in the control circuits, and when the temperature falls the temperature indicator contacts short-circuit a resistance and cause enough current to pass through the relay coil to close the relay, which is in circuit with the operating coil of the contactors for switching the heating elements into or out of circuit. When the relay is closed the short-circuit is removed from the resistance, and, as soon as the temperature rises, the temperature indicator contacts short-circuit the relay coil, causing the relay contacts to open and so make the control equipment ready to go through the same cycle again on a fall in temperature.

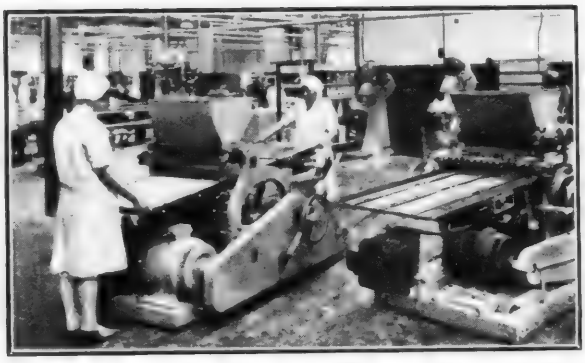


FIG. 4.—Depositing Machines driven by Motors of 3 H.P. and 2 H.P. respectively.

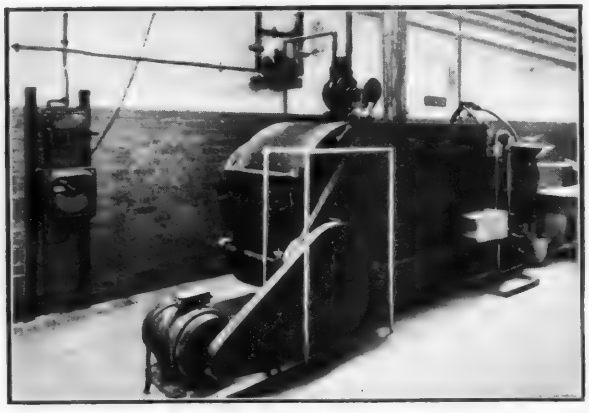


FIG. 6.—Motor 3 H.P. driving Ice Wafer Machine, Motor Starter also shown.

FIG. 5.—Chocolate Coating Machine driven by Motor of 2½ H.P.

The front glass doors of the contactor box for the oven in the forefront of the illustration are shown opened, so that the relay and contactors can be more clearly seen.

With these ovens remarkable uniformity in baking is obtained for all kinds of cakes and biscuits, and the loss of heat is remarkably small. It is said that the ovens will remain almost at baking heat after the current has been switched off for twelve hours.

FIG. 7.—Two-Tier Draw-Plate Cake Ovens with Adjustable Thermostatic Control, part of the Contactor Control Equipment being shown.

The Control of Flour Quality

By T. H. FAIRBROTHER, M.Sc., F.I.C.,
Chief Chemist, McDougalls, Limited.

Research pays, largely, when it guards raw materials. In these days of high labour costs one is not justified in taking into his plant a sub-grade material from which he may only be able to make a second-class product. Superficially, "Flour Quality" looks a singularly harmless term, but when one approaches the problem of definition difficulties arise. A recent work on the subject is discussed in the following essay-review.

FLOUR IS a substance of varying composition and properties, and varies considerably with the wheat from which it is derived. However flour may be regarded in the laboratory as the finished product of the miller, it is the raw material of the baker, and, as such, must be considered in terms of the finished article—bread. The ultimate criterion of flour value is the quality of the loaf it will produce, and one can regard flour quality as the capability of producing large, shapely, well-piled loaves, of good colour and flavour.

From the point of view of loaf production the most important characteristic is uniformity or regularity of flour quality. This is of great importance to the English miller, who is compelled to draw on wheat of the most diverse characteristics, and the quest for uniformity in flour has brought wheat blending almost to a fine art. It must be remembered that the problem of the English miller is fundamentally different from that of American or Canadian millers, who get large quantities of the same wheats and to whom, consequently, blending is not so important. In their case, wheat quality is being judged on the basis of protein content with some justification, and it is an undisputed fact that millers pay premiums for high protein wheat. In England the position is different, and the miller's main concern is to secure an absolute uniformity of character in his flour, week in, week out. This makes the processes of blending and conditioning very important factors in the production of flour, and these have a far-reaching influence on flour quality.

If we accept flour quality as meaning the index of loaf-producing capacity, then we can see clearly the factors which must be considered—these are, shape and size of loaf, colour of crust and crumb, and flavour. Hence we can see why the miller has made extensive use of the aids science has created for him in the shape of bleaching agents and methods of improving flour. In the production of a good flour the miller has to consider those factors which influence the colour, texture, and size of the loaf. These are twofold: first, blending and conditioning, and, secondly, a number of chemical and physical factors, which are controlled by the cereal chemist.

The somewhat scanty literature on the subject of the control of flour quality has been enriched by the publication of a small book by Dr. Fisher, Director of Research for the Flour Milling Research Association.* In this book Dr. Fisher deals mainly with the control which is exercised (or should be exercised) by the cereal chemist. (Apart from a brief reference, the problems of conditioning and blending are not dealt with.) The book can be regarded as an excellent justification for the presence of the chemist in the milling industry. Taking Dr. Humphries' definition of quality as "the sum of excellence on several points," Dr. Fisher proceeds to discuss quality on the points of uniformity, colour, sufficiency of gas production, maltose content and diastatic activity, and gluten content and quality.

* *Flour Quality: Its Nature and Control.* E. A. Fisher, M.A., D.Sc., Technical Education Series, No. 3, May, 1929. 26-28 King's Road, Chelsea. 56 pp., Price 6d.

Examination of Stocks.

The author, in the reviewer's opinion, rightly places uniformity first, but he deals with it rather scantily, devoting less than one page to this important factor. The careful examination of all the stocks in the mill is of the utmost importance in determining the ultimate quality of the flour, and the experienced miller deduces much from the sample board and the examination of mill stocks.

The remainder of the points are mainly chemical. In the section on colour, too much attention is devoted to bleaching, which, in the reviewer's opinion, is an undesirable process often employed by millers to cloak bad milling. The very important sections dealing with the effect of branny particles and granulation on colour are treated somewhat cursorily. The influence of smutty wheat on colour is not mentioned at all, and yet this is a factor with which most millers have to contend, and one which certainly influences the colour of the flour. The bleaching agents discussed are restricted to nitrogen peroxide and novadel, but there are many millers who use chlorine or agene for this purpose as well as for improving purposes.

Enzyme Activity.

In the gas production section the discussion on general considerations and the nature of panary fermentation is adequate and illuminating, and leads up, naturally, to the use of malt extract and ammonium phosphate to increase gas production. Diastatic activity is referred to very briefly—possibly Dr. Fisher considered that enzyme action in flour was so complex that it could only be dealt with at a length far greater than was possible in a small book of this description. The discussion on gluten and improvers leaves little to be desired. After dealing with the chemical and physical nature of gluten, the various methods used for the improving of flour are dealt with in the order:

1. Chemical improvers or powders.
2. Chemical improvement processes or gases.
3. Physical improvement processes.

This is the correct chronological order for dealing with improvers, but it is to be inferred from the text that Dr. Fisher believes that the physical processes rank first in order of desirability, an opinion which is shared by most cereal chemists.

A Useless Term.

In his treatment of flour "Strength," Dr. Fisher has initiated a movement for the abolition of a term which has been used in so many ways to express so many things that it has become virtually meaningless —the reviewer is cordially in agreement with this. He also has come across that confusion amongst millers and cereal chemists on the question of strength Dr. Fisher refers to, and it would be of value if the useless term "strength" were abolished from the dictionary of cereal chemistry and chemists and millers refrained from trying to express in one single term what is in reality a balance of some half-dozen different factors.

This little book cannot fail to be of great value to all cereal chemists and millers, and to students in the industry it offers in a small compass a general view of the control of flour quality, and this at a price well within the reach of the poorest searcher for information.

The Confectioners' and Bakers' Thirty-third International Exhibition

A Record Year for Competitions—Outstanding Exhibits

THE MOST important trade event of the year for cereal and confectionery chemists, manufacturers of baking and confectionery plant, millers and bakers, is the yearly International Exhibition at the Agricultural Hall, Islington.

At this year's exhibition, from September 7 to 13, nearly 300 firms in every phase of the industry are represented. In fact, such is the significance of the annual "show" at the Agricultural Hall to the Trade that it is almost unnecessary to say more than that the 1929 exhibition, both for exhibits and competitions, is probably a record one.

Chemical Aids.

Colour plays a decisive part in the appreciation of food. It has been established that it is the sight and recognition of food which causes one's mouth to water. The food manufacturer wants in his products their natural colour and flavour as far as possible. His difficulty with colours, however, is that they are not always immune from heat or those products with which they come in contact. Synthetic colours consequently are a necessity. But every variety of manufactured food is dependent very largely on chemistry.

The manufacture of caramels requires ammonium carbonate, caustic soda, and soda ash. In biscuit making, ammonium bi-carbonate and ammonium are found necessary for raising purposes. For cake making, acetic acid, ammonium bi-carbonate, ammonium carbonate, bi-carbonate of soda and salt have to be used. Aerated water is dependent on bi-carbonate of soda, and cordial making on sodium benzoate—two strong preservatives.

Acetic acid, chloroform, and ether are used in producing flavouring essences. Chemicals are, in fact, used in every branch of the food industry, and we feel safe in saying that the exhibit in Block 14, Gilbey Hall, devoted to the products of Imperial Chemical Industries, Ltd., will be considered of first-class interest. This display will represent a combine with over forty subsidiary and associated companies operating throughout the world.

The House of Stevenson and Howell are showing a comprehensive selection of their concentrated essences for biscuits, cakes, and every kind of confectionery, including "Fruitex," a brand of pure fruit essences prepared expressly for flavouring centres, fondants, and creams, and "Dulciflor" floral ottos for cachous, floral creams, etc. Their range of confectionery flavours also includes essences for toffees, caramels, gums, jellies, and pan goods, and about twenty flavours for boilings only quite recently perfected.

Other firms exhibiting in this connection whose stands should not be missed are Messrs. W. J. Bush and Co. (east side, Gilbey Hall), who are making a speciality of several new lines, the Birmingham Chemical Co., Ltd., and the London Essence Co.

The latter are to have testing samples of confectionery made with their essential oils and colours on their stand, and they are confident that buyers will support their statement that these essences are second to none on the market.

Yeasts and Improvers.

A centre of attraction at last year's exhibition was the British Arkady Co.'s display of bread from various continental countries. This year they have another interesting stand, and we refer those of our readers concerned with bread to Stand 48, Row P in the Main Hall.

The company are offering nine prizes this year for commercial bread made with Arkady and a cup for the best loaf sent in, this prize to be held for a year and a replica retained by the holder. The Arkady Service is becoming valuable. It is difficult to exhibit service, of course, but some of its manifestations are found in the Arkady thermometer and temperature charts and the *Arkady Review*, to say nothing of the Arkady experts who are present to explain this service.

It is the claim of the United Yeast Company that they supply 99 per cent. of the requirements of the baker. The United Yeast Co.'s display of cake decorations and ornaments covers thousands of lines from a single flower to the most elaborate sprays. Joinery

made at their Bristol works will occupy a position inside the main exhibit, and will show provers, racks, and tables, made of seasoned woods. The hardware section shows utensils, baking tins, display stands, pedestals, window fittings, bakers' bins, icing pipes, icing tables, cooks' clothing, etc. Owing to the rigid restrictions governing the showing of machinery in action, they are not able to demonstrate to the same extent as in previous years, but in spite of the new regulations they are exhibiting various models of Fern's emulsifiers (including the new "Midget" at £22), the "Human" dough kneader with a new roller arm, and the "G.B." Unecol cake mixer. A sundries section includes such products as "satinett Unecol" milk powder, tartar, "Cremefil," "Fancicreme," "Flox," "Unilac," bread improver, colours, essences, and Australian dried fruits. This stand, an exhibition in itself, is in the same position as last year.

The Dumbrill Plant and Engineering Co. who specialise in the layout of bakers' and confectioners' plant, are showing at Row X 192.

Messrs. Gardner, of Gloucester, in Bay 16, ground floor, have a marvellous range of equipment on show. Their "Rapid" sifter and mixer, widely used by manufacturing chemists and flour millers, and a sifter with single crushing rolls, driven from a brush spindle, for breaking down sugar lumps, acid biscuits, etc., are prominent.

Equipment.

The Morton Machine Co. have a "Handarm" dough kneader in operation. Another machine to be seen at work at No. 176, Row Y, is a pressure whisk with which demonstrations of a new method of sponge making will be given daily during the exhibition. By this method a sponge batter is mixed in three minutes, giving approximately 10 per cent. more yield.

Messrs. J. Harrison Carter's speciality this year is plant for the manufacture of icing and other grades of sugar from dry sugar crystal. It consists of a small disintegrator, 9 inches in diameter, to which is attached a receiving hopper and elevator, which in turn delivers the ground sugar to a sifting reel. This is covered with silk of various meshes for the purpose of separating the grades—viz., icing, pulverised, and two grades of castor. The sifting reel is followed by a collecting worm at the bottom of the hopper, which collects the various grades and delivers them into separate sacks. The sugar which is too coarse to pass through the coarse castor silk is returned automatically to the disintegrator. The speed and the screens in the mill can be varied to give a mixing of either icing or castor grades, the capacity being about 50 cwts. of all grades per day.

Messrs. Baker Perkins, Ltd., of Peterborough, have a wide display of bakery equipment, most of which will appeal to bakers with comparatively small outputs, and includes some new productions.

On the machinery side, we might mention "Viennera" dough kneader, a model with unique features. The machine is of one-sack capacity, arranged for direct motor drive, and is very compact whilst retaining all the advantages of previous types.

Secondly, we must refer to the new dough divider known as the One Drop Machine. This machine takes up less room than any previously designed by the firm; its lines are simple, and it should meet the needs of bakers wanting an article occupying little room in the bakehouse. The divider has a speed range of from 20 to 40 pieces per minute, and a weight range of from ¾ lb. to 2½ lbs. A hander-up of the well-known conical table design will be shown to run in conjunction with this divider, and the two together make an attractive combination.

Flour handling equipment is introduced in the form of a self-contained plant, comprising elevator and sifter, motor driven, specially constructed for use with a kneader of one-sack capacity.

J. and E. Hall, the refrigerating engineers, are at No. 35, Row O this year, with, of course, a first-class stand.

Poster Gallery.

A touch of colour is lent to the exhibition by the display of food posters in the West Gallery. As is natural, this art exhibition is attracting a good deal of attention, and certainly it is a bright and unusual feature.

Suggestions and advice on all phases of food advertising are being given, without obligation, by the staff of experts in attendance, and to those food manufacturers whose lines require special handling in advertisement we recommend a visit to the stand of Leonard Hill Advertising, Ltd., in the West Gallery.

The Neasden Waxed Paper Co. are in their usual place at No. 40, Row O, where their exhibit comprises waxed papers for all types of automatic wrapping machines either for confectionery or bread.

Visitors ought not to leave the exhibition without visiting the Princes Gallery, where a number of important firms will be found. The Princes Gallery is immediately over the Entrance Hall, and can be reached either through the Main Gallery or by the steps immediately on the left of the main entrance. Amongst other interesting stands in this gallery will be found what is probably the largest and most comprehensive exhibit of chocolate that has ever been made in any exhibition by a single firm.

The Competitions.

With regard to the competitions, we hear that the important alterations which have been made in the nature of the bread in many of the classes are creating widespread interest. Discussions take place whenever gatherings of bakers occur. They have been frequent in the Trade Press, and will, no doubt, be a topic of interest at the Exhibition. Entries are even more numerous than last year.

A long list of excursions on the L.M.S. Railway has been received. These range from daily excursions to those extending over a fortnight, and contains particulars of daily bookings, week-end tickets, mid-week period excursions and pleasure party tickets. A very useful excursion to the baking and confectionery trades is that on Monday, September 9. Particulars can be obtained from the Divisional Passenger Commercial Superintendent, Euston Station, London, N.W. 1.

THE EXHIBITION of 1851 is said to have contained such interesting exhibits as "The largest gas-stove in the world" and "The smallest anti-macassar," but exhibitions to-day are not so much expected to be museums as displays in some sphere or other of industrial development, in which what is newest, rather than most interesting, is to be found. As what might be called the point of a trade phalanx, an exhibition has no time to be merely static. The very atmosphere of a trade exhibition such as the one we have just seen at Olympia is characteristically dynamic.

This spirit of advance demanded by the age, so strikingly inherent in a first-class exhibition of this kind, is expressed by

1. The goods displayed—the *matériel*,
2. The design of the exhibit, and
3. The *personnel*, representing a firm.

The second of these factors will not deceive an acute buyer as to the first, and neither, in the long run, will the third. An attractive stand is important, however. We remember seeing at exhibitions in Germany stands of such dazzling novelty as to *compel* a closer inspection, though from this point of view of architectural attractiveness the Olympia exhibition was one of the best we have seen anywhere. Rowntree's stand, for instance, described by them as "modern" in style, was interesting without being Epsteinish.

The success of this firm's "Motoring" brands with the increasing pleasure-motoring public led them to concentrate on these lines. "Beech-Nut" chewing sweets were said to be getting a good reception with the retailers.

Essential Oils.

As usual, Messrs. A. Boake Roberts managed to get a pleasant colour display out of their confectionery flavouring essences, alcoholic and non-alcoholic, harmless colourings, and fine chemicals used in foodstuffs.

Messrs. W. J. Bush and Co. were specialising in tangerine, orange, and grapefruit pastes—the latter quite new. These are, of course, for use in chocolate centres and fondants. As they are manufactured by Messrs. Bush at their California factory—in the citrus belt, therefore—they are able to use tree-ripe fruit, as distinct from fruit bought on the market here which has ripened during transit. There was a lively interest in Stevenson and Howell's "Red Ball" brands.

Frederick Boehm and Co.'s stand was distinctly arresting. Not many lines were shown here, but we noticed "Nulomoline" which prevents fermentation and graining in confectionery, "Convertit," their yeasts invertase for softening cream centres, several kinds of chocolate and toffee butters, soluble fruit essences and peppermint oils.

Confectionery Plant.

There was a 24-inch band "Lehmann Enpholda" covering machine, claimed to be highly efficient for cooling, as it uses the principle of conditioned air, shown by Bramigk and Co., and we also noticed a marshmallow beater and a racing cream depositor on this stand—both innovations.

Messrs. Baker Perkins, Ltd.'s new lines were:

The "International" Enrober with new bottoming attachment, "Steely" lining-up device and decorator, arranged to do coating or half coating.

A new chocolate-bar wrapping machine.

A new tempering kettle and a chocolate-block planer to work in connection with it.

The latest type of "Hansella" continuous rotary plastic machine is a wonderful piece of engineering, its principal new feature being an attachment whereby perfectly round compressed tablets of high-boiled sugar can be made with various designs.

A well known firm of confectionery machinists of Rochdale had a number of working exhibits on view. Amongst these we saw a crystalliser for gums, etc.,

using a mechanical and dry process, which has an output of ten to twelve tons a week.

A three-speed gear-box mixer, made in many sizes for steam pressures up to 150 lbs. to the square inch, incorporated some new devices, one of which instantaneously stops the beaters when descending if they meet with obstruction. Another is a special clutch for changing gear so that this operation is absolutely silent. Messrs. Brierley, Collier, and Hartley also showed the latest thing in batch rollers, which may be heated by electricity, gas, or steam.

A range of foils, waxed backed, paper backed, and foils with tissue paper adhered by means of gummed lines were shown by Fisher's Foils, Ltd., who also had a packing machine working on toffee chocolates, cereals, nuts, and raisins, which is claimed to make an air-tight package, doing the work of ten to twenty girls. It can be synchronised to work in conjunction with automatic weighing machines when used for granular materials.

Aluminium and Monel Metal.

Among the exhibits of the Aluminium Plant and Vessel Co. were two interesting innovations. One was a continuous plastic machine, which in performance and space taken up can compete with the best German machines. The principle embodied is, however, so simple, that this machine is being marketed at two-thirds the cost of the same kind of German machine. We regard this as an achievement.

Then there was a new revolving jam cooler, working on a new principle, using a rotating cylinder upon which water is sprayed, cooling being carried down quickly from boiling point to 160 degrees to 170 degrees. Less water than formerly is used, and space is saved. It has been proved that this machine cools with certainty to the temperature required without affecting the jam in any way.

On several stands we noticed machines made with monel metal, which we were informed gives uniformly good results.

A rotary multi-colour printing machine producing shaped printed labels in one operation was attracting crowds of visitors to the stand of Messrs. Chambon, Ltd. The machine is fed from a reel of plain paper, which in its passage through the machine is printed in fine colours — four letterpress and one dry offset. Then the printed work is punched out to the required shape and delivered into runaways. Simplicity in operation, large output, and small waste in production are claimed for this interesting machine.

Rollers in various sizes, from the well-known hand power machine to the larger 6-inch rollers made on the sleeve system were shown by John Hounsell, Ltd. This power machine is provided with a safety guard securing immunity from accident—an important feature.

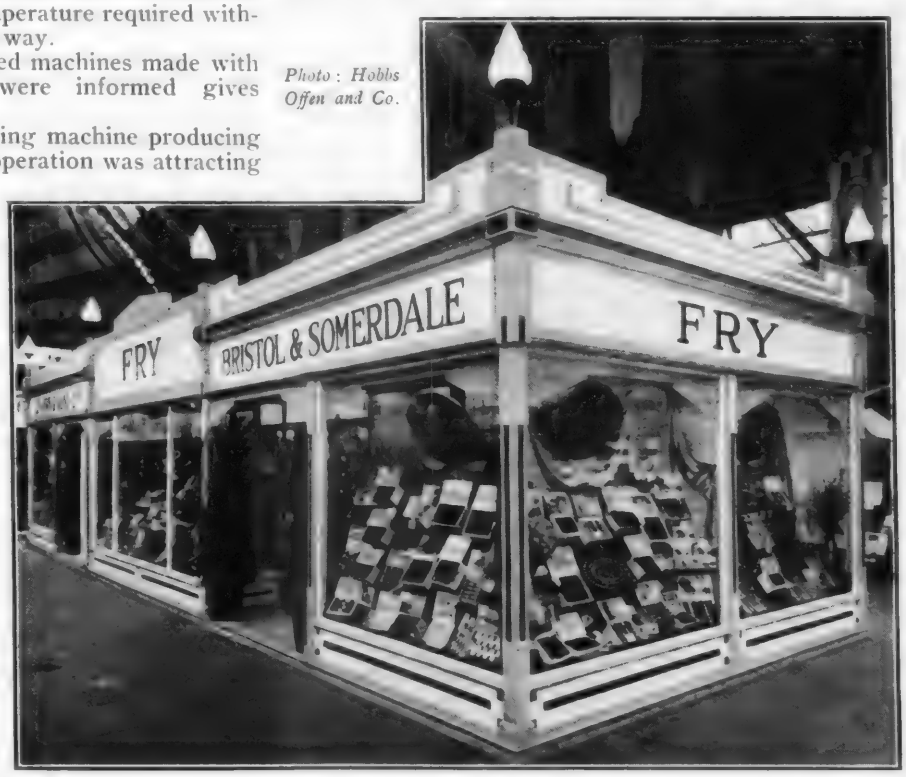
Though Fry's are the oldest firm in the trade (they were 200 last year), they are one of the most progressive. Some new introductions in assorted chocolates were "Lyndhurst" at 4s. a lb., "Operetta" and "Dresden" at 3s., and "Exmoor" at 2s. a lb. "Utility novelties," such as tea-sets and vanity boxes came in for a good deal of attention from buyers of Christmas goods.

Messrs. Cadbury Brothers' stand, of the "shop-window" kind, was what is usually called "imposing." Prominent amongst the new lines was a "Princess Elizabeth" assortment, priced at 4s. a lb., in pale blue boxes with a golden "E" encircled. The novelty is a slide carton with a pull-out tray. No snip is used in these slides, thus avoiding undesirable rustlings at theatres or concerts, and they are, of course, very convenient for slipping into the lady's handbag. The companion lines, "King George" and "Prince of Wales," are similarly fitted.

The entire Concert Hall was occupied by the Nestlé and Anglo-Swiss Condensed Milk Co., who had incomparably the best exhibit at Olympia. We noticed twelve separate side shows working at top speed. There were the well-known Kohler, Nestlé, Peter's, and Cailler lines. Amongst the new assorted chocolates, Nestlé "Gold Seal" at 4s. was the most prominent.

It has not been possible to mention more than a few of the things seen at Olympia. Almost every leading manufacturer in the trade was there, and the Second Chocolate and Confectionery Exhibition may be said to have marked the greatest effort yet made by manufacturers of these products in the exhibition field, in this or any other country.

Photo: Hobbs Offen and Co.



Reconstituted or Artificial Cream

By L. J. LORD

THERE HAS been, lately, a very considerable extension of the practice of preparing secondary, or re-constituted, cream, as covered by the recently enacted "Artificial Cream Act, 1929." It is manufactured chiefly, though perhaps in comparatively small quantities, by numerous retailers and other traders having a direct use for it in confectionery, restaurant and similar requirements. This includes those of the many steamship lines engaged in carrying on long-distance passenger services and pleasure cruises. Indeed, it was probably these services that created the demand for such a freshly made product in the first instance, though undoubtedly the order prohibiting the use of preservative in cream led directly to the ready sale of small "emulsifiers" for the use of the small trader.

The emulsifier acts by the simple process of a paddle beater functioning inside a closed container. It results in preparing an intimate mixture of dried milk powder, salt-free butter and water to the consistency of natural, or primary, cream as it might be discharged from a centrifugal cream separator supplied with fresh pasteurised milk.

Such a process is sufficiently thorough for an emulsion that is destined to pass into the hands of the consumer, or the confectioner, within the course of a few hours, but a more effective machine, the homogeniser, is advised for the purpose of producing a cream that is of the best consistency in proportion to its fat content, and one that is reliable as a stable emulsion.

Samples of excellent quality artificial cream have been reported by analysts as being received in a condition indistinguishable from ordinary cream, either directly to the taste, or when used in tea or coffee, but it should be understood that a sample answering to such a description is much superior to the product made with any but extreme care in the selection of the ingredients and the application of a sound method in the process of emulsifying the mixture.

The best "emulsified" samples of artificial cream are easily broken up in the laboratory by centrifuging with suitable re-agents, to which primary, or natural, cream is much more resistant, and the reconstituted product will usually show a milky serum separating out from the bulk of the liquid after simply standing 24 hours. This weakness is not objectionable to cream that is prepared for use or consumption within a short time of manufacture, as on the same premises, hotel or café, or for local distribution, but it is a sure indication that for a wholesale trade, a full equipment of the best plant suited to the purpose, precise and exact methods of work together with reliable supplies of the raw ingredients, are all imperative.

The provision of a sound, faultless brand of dried milk presents little difficulty. It is, however, highly advisable that it should be stored under conditions where there is no risk of the powder becoming lumpy through dampness; nor of the development of tallowy flavours from exposure to light or, possibly, undue warmth. It is the second important ingredient that is more likely to be at fault, not from the fact that the original quality was below par, but because of depreciation since manufacture. Even the choicest selected butters become intensified in flavour under all conditions not accompanied by extreme cold, which alone delays the change in "un-preserved" butter. Refrigeration as a standing condition for large quantities of perishable produce is hardly practicable once the goods begin to move over the area of distribution.

Again, we may be sure that where a certain class of butter is put forward as especially suited to the manufacture of a secondary commodity destined for a sensitive market, the butter is produced under conditions that will provide the best foundation for reliable goods. It needs to be butter of a character that will retain its freshness, and in a high degree resist the natural tendency to mature and intensify in flavour. The ordinary market for butter is not so precise in its requirements.

Unsalted Butter.

The original cream from which this class of butter is made is ripened to, and churned at, a degree of acidity markedly higher than is customary where a creamery has to deal with supplies of cream from a wide gathering area. Although, in the ordinary course of creamery butter-making, much of the gathered cream may be really sour, the mixed supplies are reduced in acidity before pasteurisation, and the subsequent ripening, where practised, is checked at a very early stage before churning. But, if unsalted butter is to be produced, fresh cream must be chosen, promptly pasteurised, cooled and treated with a carefully selected pure ripening culture of lactic acid bacteria; the acidification being then carried, under control, to a point beyond that of the mixed neutralised cream at the churning stage.

It is immensely important that the manufacturing equipment of the creamery be sterilised, so far as is practicable, in the intervals between use, and maintained in such a condition of soundness, or repair, that no metallic contamination of the cream is possible from rusted or de-tinned surfaces. Any fault of this kind is fatal to a clean flavour in the butter, contamination leading to the positive development of most objectionable flavours traceable to no other cause.

Conditions of storage at other than a suitably low temperature eventually lead to an intensification of the cleanest flavour and, in the secondary manufacture of cream, we find this manifested in a product that savours unmistakably of the butter from which it has been prepared. This is a characteristic obviously out of place in a cup of tea, though noticeable to a less degree in coffee, and it is not entirely masked by the flavours of fresh or preserved fruit to which the cream may be applied. Such comparisons, of course, depend upon the palate of the individual

(*Continued on page* 265.)

Modern Equipment in the Bakery and Confectionery Trades

J. VALENTINE BACKES, A.R.C.Sc., A.I.C.,
Chief Chemist, Fullers, Ltd.

Efficiency, economy, and ease of working are the bases on which the improved machines of to-day are built—considerations of vital interest to the food manufacturer.

THE RAPID advance of machinery brings with it a problem which has no hard and fast means of solution. New processes are established, and at once a machine is evolved to convert the process to a productive issue. But besides the new processes which call for newly devised machinery, there are the older processes, already worked by machinery in the staple industries, which are always progressing and expanding by the introduction of more efficient machines. Every machine is really the tool, the basis of research for the one which is to follow. The faults and practical inefficiency of the predecessor are rectified in the new model, with the result that the efficiency value as compared with the older type is greatly increased while the actual purchase price may be even less.

Plant Depreciation.

The effective life of a machine is not to be gauged by its period of utility, but by its comparative efficiency. It may be perfectly sound mechanically, but the question it has to answer is "Can it compete with the latest models of its type?" If it cannot, the time has come when it must be scrapped, no matter if it is relatively new or old. Depreciation of machinery is gauged by the advance and progress of the industry, and no hard and fast rule, such as a ten or even five year period of depreciation, can be laid down. An assumed period of depreciation is useful more from a factory costing point of view than a guide to replacement. The economic problem of replacement is left to be solved by financial and business insight of the industry. *Generally speaking, it is more often than not found to be sound economics to replace rather than maintain machinery which, although mechanically sound, is progressively inefficient, leaving out the question of period of depreciation altogether.*

Thus the manufacturer must take a keen interest in all new machinery applicable to his industry. He cannot afford to ignore the new types simply because those he already has are not worn out. He cannot afford, in this age, simply to replace old by new. What he must now do is replace inefficient by efficient. But how is he in a position to judge the inefficiency of his own type if he does not follow with the closest interest the developments in the engineering world? Everything is based on comparison, and the machine regarded as efficient becomes obsolete in the light of a more perfect standard.

In the chocolate, confectionery, and bakery indus-

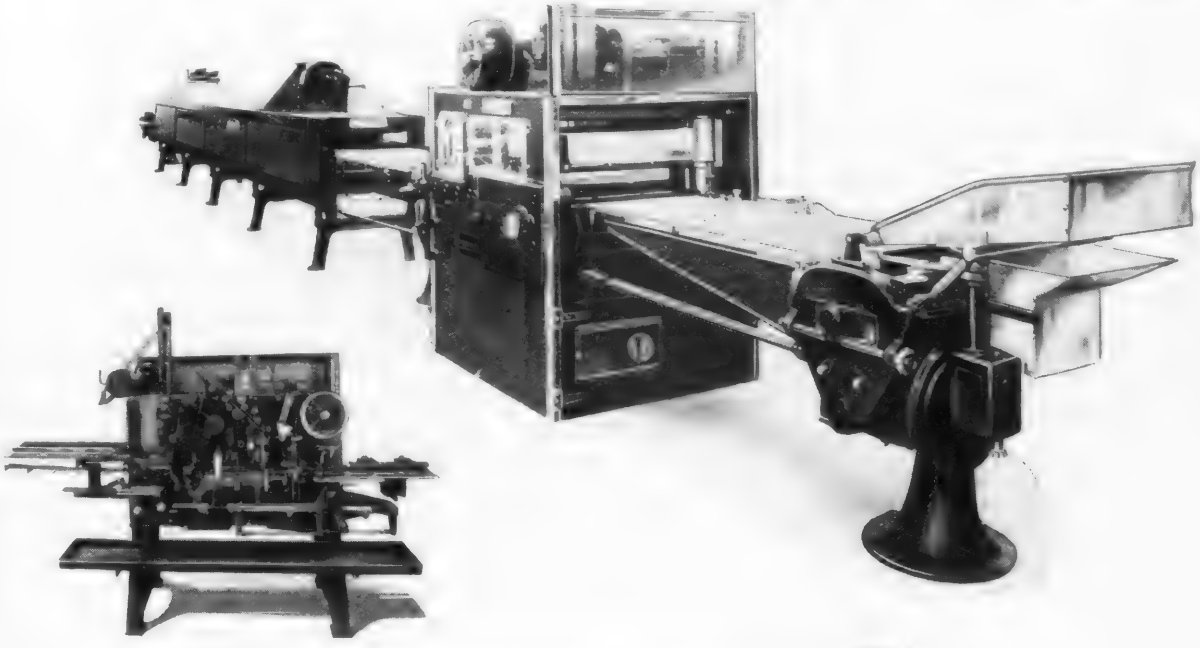


FIG. 2.

FIG. 1.

(Reproduced by courtesy of Messrs. Baker Perkins, Ltd.)

tries the development of machinery is playing a big part in the better production of goods. Types of machine are being not so much revolutionised; it is in attention given to detail, to essentials, the minor points which have major effects, that development shows itself. To study the latest models is to realise this.

In the following paragraphs some advances in the more important types of machines used in the chocolate, confectionery, and bakery industries are discussed, and it will be seen that the improvements in the various new models are *real* improvements to the trade and not just engineering "gadgets."

The "International" Enrober (Fig. 1).

This machine is made by Messrs. Baker Perkins, Ltd., of Willesden and Peterborough, and demonstrates how closely the requirements of the manufacturer have been studied. It is a self-contained unit. There are no belts or pulleys, no shafts or exposed gears. It is electrically driven from a motor mounted on the top of the case. The whole stands about 4 feet 9 inches high, and is completely encased—big items from the point of view of compactness and cleanliness. Inspection windows on the side enable the operator to have a complete view of the interior. The interior is perfectly plain—there are no corners for chocolate to collect and there is ample room for all mechanism to be easily cleaned without difficulty. The "International" differs from the original Savy Jean Jean enrober in many respects. It has a 24-inch band as against 16-inch, enabling a very much greater output to be handled. It is fitted with half-coating, decorating, and "lining up" devices. It can be adjusted to infinitely variable speeds. It has a detachable supply chocolate tank. The whole is thermostatically controlled—a point in chocolate work which cannot be overrated. In a word, it is the mechanical multiple "hand coverer." One of the most important points of this machine is the improvement in the chocolate supply tank.

The main supply tank is a separate unit of the machine. It is mounted on wheels, and can be inserted or removed at will. Thus the machine can be switched over from one blend or grade of chocolate to another without delay. This removable tank also enables easy cleaning and repairing. Those who have experienced such things as water leaks in the tank of the old type enrober and the time the machine is out of commission will appreciate what this means. The tank is jacketed, and is fitted either with thermostatically controlled electrical heating units or with steam and cold water controls.

The chocolate is elevated from the main supply to the flooding tank by an elevating worm. This elevating worm, together with the flooding tank, are combined in one unit with the main supply tank and are removable with it.

The flooding tank gives two curtains of chocolate, the thickness and flow of which can be adjusted.

Other new types of machines which may be of interest to the chocolate and confectionery manufacturer, and supplied by the same firm, are: "The Romac" drop-forming and cooling machine, "The Velvos" circular conche, and the new patent outlet which they are now fitting to storage kettles.

The "Romac" Machine.

This machine supersedes the older types in many respects. The candy is fed in through the nozzle, passes through an "equaliser" and is then cut into pieces of requisite size. These pieces are then pressed into the size and shape desired by a system of fixed and moving dies, and are positively ejected at the point of discharge. By this process a drop of uniform cylindrical shape can be obtained with polished and unmarked surface and no rough edges. The shapes, sizes, and thickness can be varied by interchangeable dies, and embossed designs or engraving on one or both sides are produced with ease. The machine can be used for practically anything that can be fed in through the nozzle—hard-boiled goods, soft-centre goods, soft toffees, etc. The output is over 1,000 pieces per minute.

The "Velvos" Circular Conche.

This new type of conche is not intended to replace or supersede the old type. It is claimed that chocolate treated in this conche for six hours will shorten

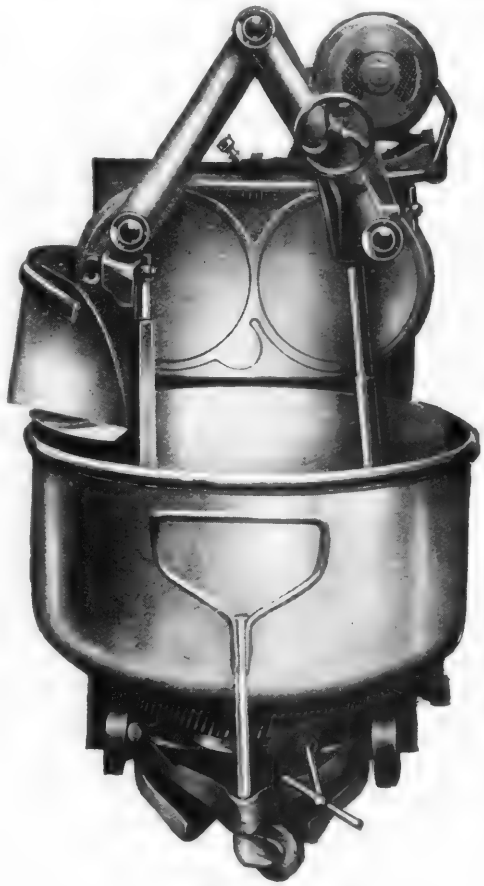


FIG. 3.

(Reproduced by permission of the Artofex Engineering Works, Ltd.)

the full conching time by nearly thirty hours. Moreover, it is compact and takes up considerably less space than the longitudinal type. The principle is that of continuous rotation of the chocolate, and by means of a paddle in the base of the machine the chocolate is forced up the outer side and passes through a perforated plate, which is continuously scraped with spring scrapers. The chocolate then falls to the bottom of the conche and is continuously recirculated. This machine can be used in conjunction with the ordinary type of conche with advantage, and is a useful unit where space is limited.

Wrapping Machinery.

One can appreciate the advance and progress made in this kind of machine. They seem more human than mechanical in their precision and delicacy of handling goods, and in speed they advance with every new model. New devices for centralising printed matter in the position desired on the goods with absolute precision at speeds up to 200 a minute are among the latest improvements. When first put on the market a certain amount of difficulty with the paper was common, and delays were not infrequent. But this has now been overcome on the latest models and practically any grade of paper can be used. A flat chocolate or almond bar wrapping machine of Messrs. Bakers (Fig. 2) is a type of wrapping machine having all the latest improvements. It will wrap bar goods in aluminium foil, tinfoil, paper-backed foil, or waxed or glassine papers fed from reels, besides "banding" the wrapped bar with a printed label fed from a stack of cut sheets. This is an example of the wide range of wrappings capable of being used on the one machine. Every new type of wrapping machine of the various makers has its characteristic good points, and in every case the later models are superseding the earlier in speed, precision, and variety of wrapping.

Mixing and Kneading Machines.

There was a time when the practical baker would never be convinced that dough could be kneaded as efficiently by machinery as by hand. A survey of some of the mixing and kneading machines of the "Artofex" type shows how improvements continuously added during the past years have produced the perfect model, so much so that not only is the human movement imitated, but it is surpassed.

The Artofex Engineering Co., among others, have produced mixing and kneading machines of a greatly improved standard. The illustration (Fig. 3) shows a self-contained mixing and kneading machine of the Artofex platform type. It is compact, which is an asset where space is limited. It thus appeals to the small as well as the big side of the trade. The pans are easily removable, and its efficiency is such that it can be employed for a multiplicity of purposes and for ranging loads. Hence the one machine can be utilised for every type of dough from the stiffest to the lightest. The mixing, lifting, aerating, and stretching—all vital factors—are performed with efficiency, rapidity, and ease. For mixing, both arms operate; while the finishing process is done by the kneading arm alone. The kneading arm practically touches the side of the pan, which rotates during the process, thus keeping the sides perfectly clean, and obviates scraping out. Such a machine gives a consistent and regular product, and eliminates that variation and "odd bad batch" which competition to-day will not tolerate.

FIG. 4.

(Reproduced by courtesy of Messrs. Wm. Gardner and Sons (Gloucester), Ltd.)

Dry-Mixing Machines.

Another difficulty now efficiently overcome by modern machinery is the mixing and blending of dry powders.

To be able to mix, say, an ounce of one ingredient with a hundredweight of another so that any sample of the resulting mixture will contain the same proportion of each is what Messrs. Gardner, of Gloucester, are able to do with their new patent rapid mixing machine (Fig. 4). Thus the mixing of baking powders, where every ounce of the final powder must contain the correct proportion of each constituent, is easily accomplished with such a machine. To have a perfectly blended powder is one of the essentials of the bakery trade, and to be able to mix large batches of individual ingredients and give a consistent blend is the main achievement of the machine.

The machine is adaptable for the mixing of any types of dry powders, and has a wide range of uses.

Nut-Cracking Machines.

If the evolutionists are right in their theory of the ancestry of man, it is a notable fact that the process of cracking nuts has not developed in spite of the aid of this hereditary trait. More probably it has become, like so many famous processes, a lost art. This is presumably due to the degree of perfection which man aims at, for the main object is not only to remove the kernel from the shell, but to retain the perfect shape, so that it is attractive to the eye. Most nuts offer no difficulty in this direction, but things like walnuts and brazils, which are among the

most popular in the confectionery trade, still require hand cracking, but even these will soon be done by machinery in every user's factory.

An ingenious principle for cracking walnuts was patented some time ago. The nuts are placed in a large, spherical container. The whole is then put under pressure by air, being slowly pumped into the container. The nut shells being porous, the air percolates through, until the interior of the nut is under the same pressure as that of the container. The pressure in the container is then suddenly released, with the result that the nuts explode and burst, being unable to hold the pressure of air inside. The shells are thus removed without crushing the kernel.

Messrs. Brierley, Collier and Hartley, of Rochdale, have a new machine for the cracking of brazils. The nuts are first treated for about three minutes with pressure steam in a type of autoclave machine. On discharge they are cracked in a small machine (Fig. 5), which is operated by a treadle. The nut is placed in position and the action of the treadle brings two cam movements into action—the first grips the nut and the second operates the cracking lever, which sharply compresses the nut sufficiently to split the shell. The machine is adjustable for taking extra large or small nuts, but for nuts of average size the one setting is sufficient. The cracking machine splits the shell without damaging the kernel provided the nuts are first treated in the steaming machine. The split shell is removed by hand and the kernel can be got out whole and unbroken.

The output is about 44 pounds of *kernels* per day with one operator.

FIG. 5.

(Reproduced by courtesy of Messrs. Brierley, Collier and Hartley Ltd.)

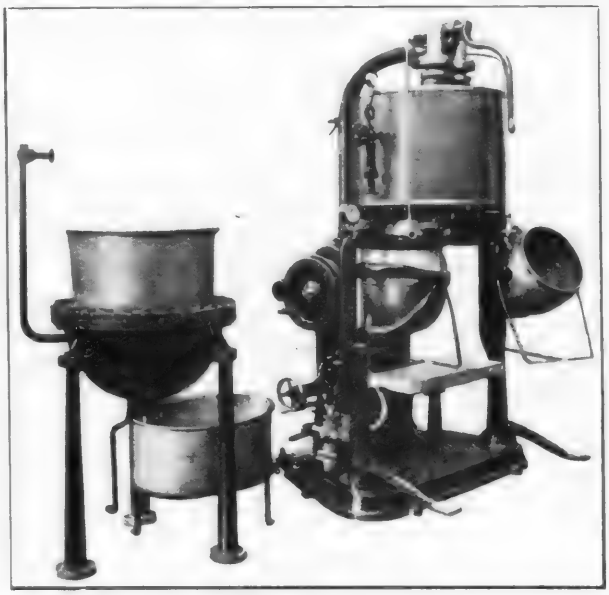


FIG. 6.

(Reproduced by courtesy of Hansella, Ltd.)

Continuous Vacuum Sugar Cookers.

Messrs. Hansella, Ltd., of London, have produced a very interesting, new, and improved type of vacuum cooker (Fig. 6). It differs from the original model in that the "cooking" coils are placed above the machine instead of under, thus conserving the heat from the machine. Besides being absolutely continuous, giving an output of 1½ to 2 hundredweight per day, it has the great advantage of being able to handle goods containing less glucose (corn syrup) than heretofore.

The batch is dissolved in a melting pan, strained, and pumped up to the continuous cooker. The cooker has two outlets, which are worked alternately by a lever to supply the two vacuum pans. When approximately 56 pounds (the capacity of the vacuum pans) are delivered into one pan, the pan is raised by a foot lever, and by so doing is instantly placed under vacuum. The second pan is then filled by switching over the lever from the cooker and placed under vacuum in a similar way. The two pans work independently, and either can be released and emptied without breaking the vacuum of the other. The degree of vacuum is controlled by a gauge, which in turn regulates the degree of the cook. Each batch of 56 pounds takes 5½ to 7 minutes to reach a boil equivalent to 330° F. When cooked, the vacuum is released and the pan can be swung out, tipped, and replaced.

The machines mentioned here are but representative of the large range of improved types which are now at the disposal of the manufacturing confectioner. They are but examples of the research which every supplier of machinery is undertaking year by year to improve an already good article. The additions and improvements are the result of co-operation between the confectioner and the engineer. The advances made are real and not merely apparent.

(*Continued from page 260.*)

consumer, some coffee drinkers, for instance, being much more sensitive to anything that is added to their favourite drink than would be implied in the above comment. In the more modified requirements of the pastrycook and confectioner, it is possible that this buttery taste, more or less pronounced according to the condition of the material used in making the cream, is not of supreme importance, but the statement is put forward as an indication of what must be guarded against. In short, butter supplies require to be mild and clean in flavour. In storage, if a cold store is available, the best temperature for the butter is between zero F. and 10° F. below, while as regards milk powder, a cool, dry store-room is required; for any exposure to warmth, light, or a damp atmosphere is fatal to its keeping properties for use in this way.

Whipping Properties.

An important characteristic in cream that appeals to the confectioner is that of whipping into a stiff spongy foam, and it is here that artificial cream may fail to commend itself.

There are several factors upon which the whipping qualities of a sample of cream depend.

For cream to give consistently first-class results it requires to be raw—that is to say, the natural primary product that has not been heated in the form of cream, though the fact that it is separated from slow process pasteurised milk at 140° F. is of no importance. Also, it should have been "aged" in cold storage for from 24 to 48 hours (the maximum), at such a temperature that acidification has not begun to appear. Freshly made cream—as separated by a centrifugal machine—is difficult to whip; sour cream will whip very nicely, but the acid only begins to take effect in this way when the cream has become markedly sour to the taste. The degree of safety under which cream may be aged in store depends, in the first place, upon its freedom from the acidifying organisms natural to milk and which are mostly destroyed by pasteurisation, and in the second, upon the storage temperature, which has to be low enough to render inert the tendency for the acid-making process to reassert itself. It is important that the storage temperature should be no higher than 45° F. to avoid the rapid development of milk acid in cream.

Cream also requires to be subjected to the whipping at a temperature not higher than 50° F., if it is to remain stiff for a reasonable length of time.

If any one of the above factors—rawness, age or cold—is wanting, whipping may be difficult. It is facilitated by a larger proportion of fat in the cream, but it has been found that, provided there is 35 per cent. of butter fat in the sample, no improvement in the stiffness of the "whip" is evident with richer cream. The average percentage of fat in sale cream is over 40—it is usually quoted wholesale at 50 per cent.—and the requisite "quality" in making artificial cream is arrived at by a simple calculation upon the assumed proportion of fat in the ingredients (the normal average of fat in butter 84 to 85 per cent. will be approximately correct).*

The addition of sugar to cream for whipping purposes has been proved to be useless. Sugar only increases the time required and reduces the stiffening. Pasteurising the cream has a deterrent effect on the whipping qualities, while the process of homogenisation (by which, in forcing the liquid cream through a finely perforated agate plate, the globules of butter fat are burst and broken into such a state of division that they will not lend themselves to the gathering action of the whipping) destroys the whipping quality of cream almost entirely.

It would thus appear that whatever the advantages of the homogenising machine to the wholesale manufacturer of primary cream—and they are very appreciable—the simple emulsifier, as a means of frequent renewal of supplies of freshly made artificial cream on the premises, is a good solution of the difficulties arising from the prohibition of "preserved" cream. It is the butter merchant who must be prepared to supply salt-free butter delivered in first-class condition as required.

The Artificial Cream Act, 1929, defines artificial cream as "an article of food resembling cream and containing no ingredient which is not derived from milk except water or any ingredient or material which by virtue of the proviso to subsection (2) of section two of the Food and Drugs (Adulteration) Act, 1928, may lawfully be contained in an article sold as cream." This would seem to allow for the addition of sugar.

It is necessary under the Act that artificial cream be described as such when offered for sale, and that containers and receptacles in which it is conveyed or exposed for sale be labelled "artificial cream."

Certain premises, as where it is manufactured for wholesale distribution and also dairies and restaurants where it is measured out for human consumption, are required to be registered with the local Food and Drugs authority, but this regulation does not apply either to manufacturing confectioners who use it on the premises "in the preparation of some other article of food," or to retailers who may sell it in "the properly closed and unopened receptacles in which it was delivered" to them.

The sterilised natural cream at present sold by grocers in cans—hermetically sealed tins—almost invariably carries with it a cooked taste that seems inseparable from the sterilising process when applied to cream, and this handicaps repeat sales very considerably. It is possible that pasteurised artificial cream, chilled and run into waxed-cup containers, may prove to be sufficiently long-keeping to pick up a good deal of local trade to the exclusion of the sterilised article, unless some means of eliminating the cooked flavour of the latter is discovered.

* Instructions for apportioning the ingredients for making one gallon of sale cream of 50 per cent. (fat) quality, work out on the following approximate lines:

Skim (fat-free) milk powder		7	ounces
Salt-free butter	5 lbs. 14 ozs. =	94	,,
Water	3 pints =	60	,,
Total weight of ingredients		161	,,

This allows a margin for waste, as 1 gal. of 50 per cent. natural cream weighs about 158 ozs. with a proportion of 4 to 5 per cent. solids-non-fat.

Considering the butter to contain 84-85 per cent. fat, we find, as see:

$\frac{84{\cdot}5 \times 94}{100} = 79{\cdot}43$ ozs. fat, and $\frac{79{\cdot}43 \times 100}{161}$ gives a percentage of 49·33 (nearly 50) pure butter fat in the sample of artificial cream.

Recipes

Ice Cream (Part II)

PART ONE in our May issue ended with a recipe for cheap ice. The cheaper are known as ice or ice-cream; those containing cream or butter are styled cream ices. Ice bricks are much the same as hokey-pokey, and more solid ice of this kind needs extra solids. In modern bricks, we give stiffness with milk solids. Eskimo pie and similar are ice bricks covered with liquid chocolate. Ice-cream sausages, or "cold dogs" are cellulose sausage skins filled with half frozen ice-cream, linked, then chilled and hardened. The first recipe in the May issue furnishes a fine ice brick if frozen longer. Or less liquid may be used.

Ice bricks are frozen in moulds, which are cloth wrapped and buried in a freezing tub, etc., with ice and salt. The mix may be poured direct into the moulds, but a good way is to freeze it in the machine, then put it into the moulds, wrap, and finish by freezing hard. The colouring is arranged to suit.

Ice-Cream Bricks, 14 per cent. butter fat, 22 pts. water, 7½ lbs. butter, 6½ lbs. sugar, 4¾ lbs. skim milk powder, and 4 ozs. gelatin. Flavour as desired, as before directed. We mentioned the emulsor machine and reconstituted cream in the previous article, and in the above mix we make a reconstituted cream for putting through the emulsifying machine.

Mixing.

Without the latter, the mix may be manipulated by soaking the gelatin in a pint of the water till soft, then liquefying by gentle heat. Add to rest of the water, in which the sugar should be melting, mix the butter and milk powder, then gradually knock up with the water, etc. (slightly warmed if necessary), until mushy. Then put through a fine sieve once or twice. Or, now it may be put through the emulsor, then is ready for freezing, after flavouring and tinting.

The above gives fat 14·13 per cent., milk solids not fat (M.S.N.F.) 10·06 per cent., sugar 14·00 per cent., and other solids (O.S.) 0·53 per cent., or total solids 38·72 per cent.

For ice-cream, skim milk powder made by the spray process is rather essential. The butter also should be good. Margarine may replace butter, or part.

Making small lots of ice-cream is usually done on a less scientific and exact plan than when operating on factory or mass-production lines. The larger producer needs to study the details following.

Unless ice-cream is consumed quickly after making, ice crystals will begin to form when a stabiliser is not used. Stabilisers are known also as "holders," "colloids," and more commonly as "binders." A "filler" is a cheapener, such as cornflour, and replaces milk fat, and milk solids not fat (M.S.N.F.), and a filler can serve as a stabiliser also, but a stabiliser cannot replace a filler. The usual stabilisers are gelatin, gum tragacanth, etc., and the ordinary fillers are the starches, as cornflour, tapioca flour, arrowroot, wheat flour, eggs, and an excess of sugar or gelatin.

Many things affect this, and the aim is to obtain a proper amount of swell with each batch. If too much swell is obtained, the ice-cream is too porous and fluffy, with a tendency to grain. If not enough swell, then the ice-cream is too heavy, and there may or may not be a risk of graining.

Temperature Control.

The nearer to 40° F. when the mix is being frozen, the easier to obtain the swell. It has been found that a temperature of about 6° F. for the circulating brine is the most desirable when using a 20 per cent. raw cream. For pasteurised cream, a temperature of from 8° to 10° F. gives best results, while for emulsified cream about 10° F., and for homogenised cream 14° F. proves the most satisfactory. The temperature of the mix when it enters the freezer is very important. If too warm, the cream will churn before it will beat up or whip. Most of the modern mixers have some means of controlling the temperature of the mix, but the operator should satisfy himself that the mix is at the proper temperature. It should never enter the freezing machine when over 60° F., and the nearer it is to 40° F., the better for the product.

Different makers handle the ingredients in a different manner, but it is usual to put in the liquid ingredients first. Steam is turned on, then sugar and milk powder are added, the mix being kept agitated. If butter is used, it is added in a melted state, and gum or gelatin previously melted is now added, the heat then being raised to pasteurising temperature, and kept at this for 25 or 30 minutes to destroy bacteria. The usual temperature is 160° F.

Emulsifying.

Homogenising follows pasteurising, and is called also viscolising or emulsifying. When the mix has been pasteurised, and it is still at a temperature of 145° F., it is drawn into the homogeniser or emulsor and subjected to a pressure of from 2,500 to 3,000 lbs. per square inch; at this pressure it is forced through a fine aperture or nozzle, and against a hardened surface. This breaks up the fat globules, causing them to mix intimately with the other ingredients. "Reconstituted cream" is made in this manner. After leaving the emulsor, the mix is cooled over a milk cooler down to 40° F.

On leaving the cooler above the mix passes into the ageing vats, which may be similar apparatus to the mixer pasteurisers. The mix is kept in these vats at a temperature of from 35° to 40° F. for from 12 to 72 hours. Ageing increases both the viscosity and acidity. The increase in lactic acidity is desirable, and is very slight if the ageing is carried out below 40° F. unless the ageing period is extended considerably. Some manufacturers dispense with ageing.

It is proved, however, that ageing, if properly controlled will provide increased yield and a better finished product.

Rusks: Assorted

By J. BOYD

TO THE enterprising baker the making of these highly nutritious specialities forms a most interesting and remunerative side-line. There is a number of proprietary rusks on the market, all good, but why buy what you can make yourself?

Unfortunately, some master bakers neglect the fact that their own personality or name can have a greater drawing power with their customers when it comes to buying goods displayed than would be the case where well-advertised goods are shown alone.

A card displayed on top of goods and written on it the three "magic words" "Our Own Make," helps trade considerably when dealing with manufactured goods.

Plain Rusks:

8 lbs. strong flour.
2 lbs. sugar.
1 pint yolks (30).
Water sufficient.
2½ lbs. strong flour.
2 lbs. fresh butter.
3 pints whites (60).
6 ozs. yeast.
2½ lbs. soft flour.
A little yeast food. (There are many to choose from.)

Beat whites in machine as for meringue, adding half the sugar gradually. Make into a slack dough (not a batter) the 8 lbs. flour (water at 103° F.) yeast dissolved in cooler water, yeast food, and beat up whites. After being made into a clear, slack dough, cover with clean cloth, and allow to prove in a warm corner for one hour. During this period, place butter in stewpan and melt over fire; add remainder of sugar, then yolks; mix thoroughly and keep at temperature of 95° F. At the end of the hour, mix this butter composition through the sponge till thoroughly amalgamated; then stiffen up into a nice dough again with the remaining 5 lbs. of flour. Allow to lie a further forty-five minutes, giving a knock back and good knead every fifteen minutes.

When ready, turn on to dusted slab, weigh into ten pieces at 2½ lbs. each. Mould as you would for a loaf, and place each piece in a 6 lb. cake tin (well greased); set aside to prove without steam till the dough almost reaches top of tins; then on top of each piece of dough in tins place a flat piece of tin that just covers surface of dough. Bake in warm oven for about forty-five minutes; remove covering tin and turn out loaves on to wires; put aside to cool till next day. The idea of the covering tin is to eliminate waste as much as possible when it comes to trimming and cutting rusks.

To prepare the rusks, remove the top skin with a sharp knife, not necessarily right into the "white"; rasp the sides and bottom of loaves, then cut each loaf into three, lengthways (bottom upwards). Cut each of these lengths into fourteen pieces; place the cut pieces packed close together on clean biscuit wires, and bake in moderate oven till nicely toasted. The ideal oven is when the rusks brown top and bottom without turning them on wires. If not in this condition, all the rusks will require to be turned. As they come from oven nicely browned and crisp, place on suitable boards and allow to dry out overnight in a good hot press. The rusks are then packed into 4 oz. packets, the transparent paper packets being suitably printed with firm's name and variety of rusk. I quite understand that passable rusks can be made from stale pan loaves, etc., and made up to resemble the real Mackay. In this article I deal only with the best and genuine stuff.

Rusks without Sugar:

3 lbs strong flour.
2 ozs. yeast.
2 ozs. glucose.
8 eggs.
1½ lbs. soft flour.
1 oz. fine salt.
5 ozs. butter.
1¾ pints milk.

Set away a batter with milk at 105° F., salt, glucose, yeast, and sufficient of the flour. When ready, about twenty-five minutes, add the remainder of material (butter and eggs heated as for previous mixing). Make into a fairly stiff dough, and pass through the rollers till a nice smooth skin is attained. Then scale into fourteen pieces at 7 ozs. each; mould each piece well and place in small ribbed tins, greased. (Those ribbed tins are the same as those used for 6d. Balmoral Sponges.) Prove till dough is at top of shape; bake in medium oven.

Next day simply cut into slices as shown by marking of shape; bake as for No. 1, on wires, and pack in suitable packets.

Coffee Rusks:

1 pint water.
12 ozs. butter.
3 ozs. yeast.
Pinch of salt.
4 ozs. coffee essence (bakery essence).*
1 pint milk.
8 ozs. sugar.
4 eggs.
Pinch of ground nutmeg.

Sponge and dough as for No. 2, with sufficient strong flour. When ready, scale into 3 lb. pieces; mould and place in small pan loaf tins (long). Bake and finish as for the others; the colour of this rusk at times proves distasteful to some—yet, once they taste it, all's well.

Malted rusks, wholemeal rusks, etc., may be made by using formula No. 2 or No. 3 and adding malted meal or extract, part wholemeal in place of the other ingredients specified.

* Coffee essence referred to is made specially for bakery use, and is highly concentrated; no other essence will give the finished job.

FOOD MANUFACTURE is sent to any address in the World for 10s. per annum. Send your subscription now to LEONARD HILL, LTD., Thanet House, 231-2, Strand, London, W.C.2.

Trade News and Enquiries

WE ARE informed from Wellington, New Zealand, that two well-known brands of chocolates, Cadbury's and Fry's, are shortly to be manufactured in that country. Experts are on their way to the Dominion, and a modern plant is to be erected at some centre which has yet to be chosen. The reason for this development is the high tariff imposed on imported chocolate by the New Zealand Government.

* * *

The Right Hon. Noel Buxton, M.P., Minister of Agriculture and Fisheries, has promised to preside at the luncheon which is to be held on the opening day of the Confectioners' and Bakers' Exhibition, September 7. It is anticipated that Mr. Buxton may have some interesting things to say in connection with the Trade, and it is possible that the suggestions with regard to British wheat flour may be mentioned by him.

* * *

The City offices of the Exhibition at 11, Queen Victoria Street, are closed from Monday, September 2, to Tuesday, October 1. The address in the meantime will be the Royal Agricultural Hall, London, N.

* * *

We are informed that Mr. W. E. Winch, the popular representative of Messrs. Stevenson and Howell, Limited—than whom, probably, no representative of any essence house possesses a wider circle of friends—is about to relinquish his business activities and retire into private life. His association with Messrs. Stevenson and Howell covers the whole period of their existence, since he joined the original firm founded by Mr. William Stevenson and the late Mr. Reginald Howell in 1882; thus he has completed forty-seven years of service, during the greater part of which time he has worked in the capacity of travelling representative in the Midlands, East Counties, and formerly in the Southern English Counties.

To mark their appreciation of his unique service, the directors of the company have presented Mr. Winch with a suitably inscribed gold watch, in addition to a retiring pension.

No doubt many of our readers will join Messrs. Stevenson and Howell in wishing Mr. Winch many years of well-earned leisure in his retirement.

Enquiries

60. Emulsifying machines. An important food concern will welcome particulars of machines suitable for preparing edible emulsions. Write BM/KFEC.

61. Wanted: manufacturers of Nut Butter (Coconut, Almond, Walnut, etc.) in 1 lb. tins for export.

62. "We are desirous of obtaining recipes for the manufacture of sweet pickles and pickled walnuts on a commercial scale."

63. "Can you put us in touch with one of your readers who would supply us with a suitable recipe for Blackberry and Apple Jam, with information as to the grade of sugar which is usually employed for this purpose."

64. "I should like to get in touch with a private food analyst with reference to a food product in poroden form."

65. Wanted: a reliable recipe for making a coffee essence that will remain in a liquid form for several months when bottled.

66. (1) We should like a recipe for a snow white glaze for cooked meats.

(2) A recipe for the manufacture of what is known in the cooked meat trade as "Wiltshire Roll" or "Chicken and Ham Roll." There are many qualities on the market and we should like a very good one.

(3) Is it possible in making sausages to dispense with the "silent" machine by putting the meat and rusks through a fine mincer and then in a mixer such as bakers use for dough mixing?

Answers to Enquiries

66. (1) *White Glaze:*

25 pts. clear white gelatine
25 pts. farina or cornflour
50 pts. water (about)
2 pts. salt (about)

The gelatine is soaked in water for about 1 hour and dissolved in its own absorbed water. The cornflour or farina is mixed with the necessary water to make a thin cream and added to the gelatine solution along with the salt and enough water to make the required weight.

The mixture is kept hot until incorporation is complete, rubbed through a fine hair sieve and cooled to the required temperature for dipping.

(2) *Recipe for Roll.*—These are best called by general rather than specific names unless they are of a very superior kind. The following makes a good roll and is described as "Ham and Tongue Roll." By varying the ingredients any name might be given. It is the aim of most makers to produce a palatable and wholesome article rather than to specify particular ingredients which may not be present in any important proportion. Flank bacon may be used with advantage in modifying the following formula and fowl meat may replace part of the pork or beef.

8 lbs. pork	1 lb. farina
5 lbs. veal	2 lbs. rusk
5 lbs. flank beef	3 ozs. pepper
4 lbs. tongue	1 oz. ginger
2 lbs. ham	10 ozs. salt
2 lbs. flour	¼ oz. mace

This should make about 15 rolls of 2 lb. each.

(3) *Sausages.*—We do not think that sausages can be satisfactorily made in a mincer. A mixture will require to be passed through more than once and the heat developed will be considerable, with the consequent grave danger of the sausages going sour, especially as it will be necessary to mix the ingredients in the "baker's" mixer after.

We are also very doubtful if mixing would be satisfactory. Patchiness would result, and if artificial colour were used this would show up badly. We do not think that the proposed method would prove satisfactory in practice.

"CRYSTAL WORK is a lost art," writes Lehman in the *Manufacturing Confectioner*. "Blistered, spotted, and dull goods are in the majority. A number of firms no longer even take the trouble to crystallise their goods, merely "sugaring" them. Some steam crystallise, but both products look cheap when finished."

He adds that steam crystal, if put on properly, makes a fair-looking crystal, although nothing to compare with the clean, bright sparkle of regular crystal. Where proper care is taken in cooking starch gums, and where they are left in the hot room for a sufficient length of time and sugared properly, there is little excuse for bad crystal work.

A New Panacea.

Medical science of the older school considered such foodstuffs as full milk, cream, and all kinds of sweets, anathema in the diet of those suffering from obesity, hardening of the arteries (*arteriosclerosis*), gout, etc., but this idea is rapidly losing ground.

Der Zuckerbäcker, commenting on a recent paper by Neuberger on this subject, says:

"Well-known specialists of international reputation, after several years' investigation, have established the fact that lime feeding is remarkably useful in the treatment of diseases of the heart. By means of much increased ingestion of foodstuffs rich in lime, permanent cures have been effected in many cases of heart trouble, neuralgia, neurasthenia, and other neuroses. In fact, the value of food containing lime *in organic combination* is being rapidly recognised. For this reason, chocolate products and other sweetmeats are playing a new and important rôle in nutrition in a large range of illnesses."

Chocolate as Medicine.

It is true that cacao contains the relatively high lime content of 5·7 per cent., the sugar beet, 6·8 per cent., and the accessory materials of the chocolate industry, such as almonds, walnuts, and coconut, 8·81 per cent., 8·59 per cent., and 4·82 per cent. lime, respectively. Natural vanilla contains not less than 27·4 per cent. lime. According to this theory, chocolate becomes an important medicine under certain circumstances. Obesity, in the light of this new knowledge, is a disease of the metabolism, for which reason the use of cocoa, chocolate, and other high lime foods is recommended in order to enrich the lime content of the blood. Subnormal lime conditions of the blood occur in conjunction with *arteriosclerosis*, gout, and the commoner heart troubles. According to Boesser, the ingestion of table salt must also be increased.

Emulsification.

It was pointed out by a writer in the Philadelphia *Confectioners Journal* recently that fat which is to be used in confectionery manufacture will distribute more uniformly if it has been dispersed properly before its use in the cook, and urges that insufficient use has been made of homogenisers and colloid mills when we are using so much milk and gelatine in our products.

It is a known fact that dairy butter, for instance, will distribute better through a cook if it has been previously dispersed through milk than if it is just thrown into the batch in the usual manner. The more uniformly the fat is distributed and the smaller the particles which are present, the smoother the texture of the finished product and the longer its keeping qualities. This problem of the proper method of fat incorporation has not so far received the attention it merits from the trade.

Almonds and Diabetics.

In a report made before the American Chemical Society at the University of California in the last week of July, attention was called to the apparent fact that almonds and almond meal are of value for the dietary treatment of constipation, diabetes, and epilepsy in children. The report was made before the section on agricultural, biological, and organic chemistry, by Professor Agnes Fay Morgan, Clara M. Strauch, and Florence Blume, of the household science laboratory of the University of California.

It was reported that careful chemical analyses of defatted almond meal were made to determine the nature of the carbohydrates present. Blanched almonds were used. These had a total of 8·5 per cent. carbohydrates. Of these carbohydrates, 27·6 per cent. was sucrose, 24·7 per cent. pentosans, 13·7 per cent. crude fibre, and 44·9 per cent. acid hydrolysable carbohydrate.

The digestibility and diabetes control possibilities of the meal were tested by feeding almond meal to rats. It was found to furnish bulk, thereby decreasing constipation, and to reduce the blood sugar and glycogen content of the rats, thereby acting as a control on the tendency toward high blood sugar in diabetes.

Food Advertising.

Manufacturers and distributors of foods have discovered the secret of *selling* their products in their advertising. They have found the modern colour vogue to be applicable in a superlative degree to the picturisation of their wares.—*Westvaco Inspirations*.

Europe to "Go Dry."

It is well known that Mr. Henry Ford is setting up factories, in connection with his plans for the expansion of his industry, all over the world, and, we learn from the *Brewers Journal*, he will insist on prohibition among his employés in every country as rigidly as he does in the United States.

"There," asserts our contemporary, "testing a worker's breath is frequently resorted to, while their homes are not immune from social searchers, dismissal following any breach of the adamant rule." It further appears that Mr. Ford told the U.S. President, when paying him a visit at Washington recently, that he intended "to dry up Europe."

Meanwhile.

The State of Wisconsin has, by a plebiscite of its citizens, disowned the dry law. This is the fifth State to do so, the others having been New York, Maryland, Montana, and Nevada.

Another Evil.

Senator Smoot, of Utah, has introduced a Bill, designed to include tobacco and tobacco products within the scope of the Food and Drugs Act, into the United States Senate. He wants to amend the Act so as to bring advertising of such products under strict regulation.

The Senator's inspiration for the Bill can be gathered from the speech he made in introducing it. He said:

"Not since the days when public opinion rose up in its might and smote the dangerous drug traffic, not since the days when the vendor of harmful nostrums was swept from our streets, has this country witnessed such an orgy of buncombe, quackery, downright falsehood, and fraud as now marks the current campaign promoted by certain cigarette manufacturers to create a vast woman and child market for the use of their product."

School for Canners.

A course in fruit, vegetable, and meat canning is being held at the Royal Hungarian Institute of Zymology between August 30 and September 21, which will also include methods of packing and transport. Both in the laboratory and model cannery practical demonstrations are being held. The course is under the direction of the principal, Dr. Eugen Hérics-Tóth.

Japanese Shrimps.

There are two principal canneries engaged in the canning of shrimp in Japan, the Usui Cannery at Kanajiri, Hokkaido and the Fujino Cannery at Nemuro, Hokkaido. There are seven other canning plants in Nemuro and Kanajiri which sell their output under the name Usui or Star Brand, the latter being the Fujino trade mark.

Only the shrimps caught off the shores of Hokkaido are suitable for export however. The shrimps are boiled, the shell removed, and packed in a tin lined with vegetable parchment paper. The exports are then confined to Kobe and go to China and the South Seas. There are large catches of shrimp and prawn off the Shizuoka coast, but these turn soft after canning, and so are unsuitable for that purpose.

American Mergers.

The name of the John Bean Manufacturing Company has been changed to the Food Machinery Corporation, the new name being more representative of its enlarged operations. John Bean Mnfg. Co. will be maintained as the operating name for the agricultural and deciduous fruit packing house equipment business, both in San Jose and at the Lansing, Mich., plant and the various other divisions will continue to operate under their own names as subsidiaries of the Food Machinery Corporation, John D. Crummey being president.

The Food Machinery Corporation is now the holding company for the following concerns: John Bean Mnfg. Co.; Anderson-Barngrover Mnfg. Co.; Sprague-Sells Corporation, manufacturers of vegetable and fruit canning machinery; Stebler-Parker Co., manufacturers of citrus fruit equipment; and the Rimple-Morgan Plow Co.

At the Retailers' Washington Convention. Mr. Hoover, the U.S. President, sweetens the day with Candy.

The merger of the Fleischmann Company with other concerns in the American food industry which has been rumoured for several months became a reality recently, when an official announcement was issued which disclosed the company's plans. The new company is called Standard Brands, Inc.

The merger takes in the Royal Baking Powder Company and its Canadian subsidiary, the E. W. Gillett Company, Limited, and it is anticipated that other nationally known food concerns will soon be included.

Rye Bread Decline.

Large Austrian factories, which formerly undertook only the making of black bread, are now preparing to manufacture small breads and rolls in keen

competition with the small family baker. Already many steam-pipe ovens, roll-shaping machines, etc., have been installed. It would appear that the question of quick delivery service will be the issue upon which the success of this competition will be decided.

Invert Sugar Honey.

Fiehe and Kordiatzki report (in the *Zeitschr. f. Unters. Lebensm.*) that comparative experiments on genuine and artificial invert sugar honeys were conducted by three methods. Troje's method, titration with an alkaline solution of iodine; Lank's method, and determination by precipitation with phloroglucinol were carefully tested. Only the phloroglucinol and Lank methods gave reliable results—that is, both gave heavy precipitates and strongly reduced dilute alkaline copper solutions with artificial honeys only. Genuine honeys gave negative results. Troje's method was distinctly unreliable in differentiating genuine from artificial honeys. The samples were prepared as follows for the comparative tests: A solution of 100 gm. was precipitated with zinc acetate and potassium ferrocyanide, and the filtered liquid extracted with ether. This extract, after further treatment, was dissolved in water and aliquoted.

A Dangerous Moth.

Serious damage is caused in the chocolate and confectionery industry by animal organisms. In a recent paper to the German Chemical Society at Breslau it was shown that certain moths, notably the hay moth, *Ephestia elutella*, are especially damaging. This moth damages other foodstuffs as well. As the development of the larvæ occurs in only a few days, their presence in confectionery is by no means an indication of age of the affected goods.

Soft Cream Nougat.

For filling chocolate forms: Two and one-half quarts of whipped cream are boiled with 12 pounds of sugar until the sugar crystallises and becomes crumby. The mass is now heated further until the sugar melts and becomes light brown. It is then poured upon a marble slab or iron plate. After cooling, the mass is broken up, placed in the melangeur with 18 pounds of shelled and roasted almonds, and agitated. Only 16½ pounds of hazel nuts are used instead of almonds, because of the greater fat content of the latter nut. Too much fat would make the nougat too soft.—*Der Zuckerbäcker.*

A New Dye.

An additional food dye is to be included during September in the list of colours already certified by the United States Department of Agriculture. This product is to be named "Brilliant Blue F.C.F.," and is similar in shade to the well-known patent Blue V. It resembles Fast Green F.C.F. in general properties, and has the same greenish-blue tint.

Brilliant Blue F.C.F is intended for use in mixtures, especially in conjunction with tartrazine, to produce bright green shades. Its fastness to light, preservatives, fruit and vegetable pulp and high temperature is excellent, which makes it suitable for all classes of confectionery. This colour can be produced at a comparatively low price and is much cheaper than Fast Green F.C.F. Four colours have now been added to the American schedule within a comparatively short time. These are Fast Green F.C.F., Sunset Yellow F.C.F., Ponteau S.X. Red, and Brilliant Blue F.C.F.

Openings for British Trade

British firms may obtain the names and addresses of the persons or firms referred to in the following notices by applying to the Department of Overseas Trade, personally or by letter (Development and Intelligence), 35, Old Queen Street, London, S.W.1.

Applications for names and addresses must be sent to the Department of Overseas Trade, except where otherwise stated.

Provisions (Cheese, Hams, Food Specialities).—A manufacturers' travelling representative, who has been engaged in business in India for many years, is at present in the United Kingdom and is prepared to discuss with British manufacturers of the above-mentioned goods the question of representing their interests in those markets. (Ref. No. 124.)

Industrial and Agricultural Machinery.—A firm in Hamburg desires to secure the representation of British manufacturers of the above. (Ref. No. 156.)

Medicinal Extracts.—A British firm with offices and showrooms in Cairo and Alexandria desires to obtain the representation of British manufacturers of fluid extracts for the manufacture of medicinal syrups. (Ref. No. 176.)

Provisions, Confectionery, Druggists' Sundries, etc.—A firm of Eastern merchants, who have eight representatives periodically visiting Malaya, China, and Hong Kong, desire to secure additional agencies for the above lines. (Ref. No. 179.)

Shellac.—A firm of manufacturers and merchants in Guadalajara, Republic of Mexico, is desirous of purchasing shellac. (Ref. No. 235.)

Refrigerating Plant.—A well-known electrical concern in Barbados are willing to accept the agency for a British manufacturer of small automatic refrigerating plants suitable for tropical conditions. (Ref. No. 185.)

Canned Herrings and Dried Cod.—A commission agent established in Alexandria desires to obtain the representation of a British firm dealing in the above. (Ref. No. 199.)

Milk Cans, Cream Cans, and Cheese Hoops.—H.M. Senior Trade Commissioner in Canada reports that a Canadian dairy supply house is desirous of receiving quotations from British manufacturers of sheet metal milk cans, cream cans, and cheese hoops. Firms in a position to offer such articles of British manufacture can obtain further particulars of this enquiry on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Ref. B.X. 5591.)

Agent's Services Offered.—A commission agent of Santo Domingo is interested in obtaining British agencies for lard and rice. (Ref. No. 227.)

Books Reviewed

Wheat Studies of the Food Research Institute. Stanford University, California.

The Stanford University has for a number of years been carrying out considerable research on the problems arising out of the cultivation and distribution of wheat. Periodically the results of their investigations are published under the title *Wheat Studies of the Food Research Institute.* The six numbers under review cover a rather extensive period, from July, 1925, to September, 1928. Two of the articles relate to the problem of Canadian wheat. The first (July, 1925) deals with Canada's production and exports of wheat; the second (November, 1926) deals with American importation of Canadian wheat. Two volumes relate more to the scientific side of wheat production, the one published in February, 1926, referring to protein content with regard to wheat grading, and the other (June, 1928) discusses the objectives of wheat breeding. The remaining two volumes are mainly statistical, "Statistics of American Wheat Milling and Flour Disposition since 1879" (December, 1927), and "A Survey of the Wheat Situation, April to July, 1928" (September, 1928).

The discussion on protein content as a neglected factor in wheat grades was published in February, 1926, and constitutes a plea for the grading of wheat according to protein content, so that the premiums which millers pay for high protein wheat should be reflected back to the growers. Considerable progress has been made in this direction since 1926, and a commission appointed by the Canadian Government has just issued a comprehensive report in which it is recommended that protein content of wheat should be taken into account in grading wheat. The subject is treated comprehensively, dealing with protein premiums in relation to the producer, domestic milling, the world trade, and the general public.

The bulletin on the "Objectives of Wheat Breeding" is well written, and contains much interesting information, and deals with the history of wheat breeding and the complexity of the problem of wheat breeding. A particularly interesting section is that devoted to breeding for yield or protein content, but one cannot agree with the suggestion that Yeoman wheat yields about as much as other varieties grown in England. Most growers find Yeoman rather a poor yielder. This study forms an admirable survey of the objectives of wheat breeding, and should form a good starting-point for those who intend to proceed further with this branch of scientific agriculture, and at the same time gives a broad view of the subject to the general reader.

The two volumes which deal with the production of wheat in Canada and the American imports of Canadian wheat were written over two years ago, and events since then have justified many of the statements. The statements that Canada has large potentialities for increase in wheat acreage, and that the increase of wheat acreage will be favoured by railway interests and governmental policies, have been proved correct. The enormous surplus of wheat in Canada this year is evidence for the first statement, and in order to facilitate its exportation freights have been reduced. The conclusions reached are somewhat modified by the Russian situation. The writer of the article expressed the view that Russia would return as an important competitor in the world's markets and that there would be an increase in Russian exports. The reverse of this has happened and Russia to-day is in the importing class, and some of the Canadian surplus may be absorbed by Russia.

The volume on American importation of Canadian wheat is of more interest to the American student of wheat economics than to readers in this country. It is compiled with great care, and contains much statistical matter, and records of the daily prices at Minneapolis and Winnipeg are tabulated.

The publication of statistics of the American milling industry, which has developed in recent years, led to the compilation of a record which covered earlier years, and the volume dealing with statistics of American wheat milling since 1879 gives a broad survey of the wheat ground and flour consumption since 1875. It is found that the total quantity of wheat ground varies from year to year considerably more than the total flour output, owing to variations in the amount of wheat required per sack of flour. The latter depends very closely on the average weight per bushel of the wheat.

The last volume under review is a survey of the wheat situation, April to July, 1928. The data obtained indicated that the international statistical position was easier than in 1927-28, and nearly as easy as in 1923-24, and suggested that a world wheat price level, the lowest since 1923, would prevail in the coming months, and that international trade in 1928-29 ought to be of record size. Events in the wheat markets earlier this year have shown that this surmise was justifiable, although other factors—climatic and otherwise—have recently caused wheat prices to harden considerably.

These volumes, as are all the wheat studies of the Stanford University, are of great value to all interested in wheat production and flour manufacture. The milling industry is gradually becoming a very scientific industry, and the statistics and information so usefully compiled are of the greatest importance to cereal chemists and millers, as well as to buyers.

T. H. FAIRBROTHER.

The Carbohydrate Content of Foods. Medical Research Council Special Report 135. H.M.S.O. 2s. 2d. post paid.

The Medical Research Council have sought to remedy the lack of accurate information about the values of the carbohydrate constituents in common foodstuffs. In spite of the large amount of attention devoted in recent years to the study of nutrition, an adequate investigation of this subject had still to be performed. The valuable paper which the Council have now issued as No. 135 of their Special Report Series not only contains statistical tables giving an exhaustive analysis of over 80 different foods classified as fruits, nuts and vegetables, but in the second part of the Report, which occupies the bulk of the Paper, there is a detailed discussion of the food value of vegetable carbohydrates. In this section of the Report there is a discussion of such subjects as the dietetic value of wholemeal bread, etc.

Effects of Wheat Drying upon Milling and Baking Properties. R. C. Sherwood, Director, State Testing Mill, Minneapolis. Bulletin No. 66. State of Minnesota. State Department of Agriculture Dairy and Food.

Two types of commercial grain driers were used in these tests; both types are extensively used in the United States and Canada. In the first, called the indirect method, air is heated by passing over steam radiators and it is then carried over the grain; in the second, called the direct method, hot flue gases from burning fuel (coal or coke) are drawn from the furnace, diluted and cooled to the desired temperature with outside air and then the mixture is forced through the grain.

It is stated that the amount of moisture removed from the grain depends upon three factors:

(i.) Original moisture content of the grain.

(ii.) Temperature of the air forced through the grain.

(iii.) Time of exposure to the hot air.

A full description of the experimental drier is given, accompanied by photographs and diagram.

A preliminary investigation was carried out to determine the effect of sulphur-dioxide, which would be found in the flue gases in the direct method. From acidity determinations it was concluded that sulphur-dioxide could be absorbed by damp wheat, sufficient to affect milling and baking qualities, but only at concentrations higher than those found subsequently in the flue gases of the drier.

Careful control was kept during the experiments and temperature charts are given.

1st Series.—In the continuous flow method the wheat was in contact with the hot air for not longer than 20 minutes and the temperature of the air did not exceed 180° F. The temperature of the wheat varied during its passage through the drier from 118° F. to 155° F., the latter being reached at the bottom of the heating section. Moisture removed from the wheat was:

Indirect method 15·8 − 13·3 = 2·5 per cent.
Direct method 15·8 − 13·1 = 2·7 ,, ,,

No deterioration in milling or baking qualities was observed, either in the patent or the straight run flours, although baking tests were carried out: (*a*) in the laboratory bakehouse, (*b*) in a commercial bakery, (*c*) on the standard test baking procedure (Tentative method A.A.C.C.). It was concluded that drying of wheat in these tests was not responsible for any impairment in baking properties as judged by loaf volume, colour and texture, based on comparison with the control or undried wheat.

The small percentage of sulphur-dioxide in the heated air passing through the wheat in the direct method caused no significant difference in hydrogen-ion concentration and no effect on baking quality.

2nd Series.—The original moisture content of the wheat in the first series was 15·8 per cent., and the report states that in drying wheat with a higher initial moisture content, longer time would be required. This second series was undertaken with a wheat having a moisture content of 17·0 per cent. (part of this moisture was added). The atmospheric temperature was lower in this series. A longer time was required to raise the temperature of the wheat and to lower its moisture content to approximately 13·0 per cent. Temperature of the air was maintained at about 173° F., but the temperature of the wheat did not rise above 130° F.

A "batch" test was also made in the indirect method—*i.e.*, the heater was filled with damp wheat and after each 20 minutes the lower half of the wheat was dropped to the cooler and the heater refilled. In this, the highest temperature of the wheat was under 120° F., although it is possible that localised overheating may have taken place at some points.

Baking tests showed no impairment in quality, except that in one test the "batch"-dried wheat flour had rather poorer dough quality.

It is concluded from these tests that wheat drying can be carried out successfully, without injurious effects upon the milling and baking qualities, but that careful control is imperative to ensure that overheating does not occur. It was found more difficult to control the temperature in the "batch" method than in the continuous methods.

C. W. HERD.

Current Literature

Fruit and Vegetable Products

484. The Available Carbohydrate Content of Some Fruits and Vegetables. Bell, Long and Hill. (*J. Metabol. Res.*, January, 1925 to December, 1926.)

485. Chocolate Quality and the Cacao Moth. Whymper. (*Mnfg. Conf.*, 9, 7, 50-52.)

486. Freezing Grapes and Grape Juice. Joslyn. (*Fruit Prod. Jour.*, 8, 11, 10-14.)

487. A New Fruit Cereal. Reed. (*Ibid.*, 12-13.)

488. Canned Pear Products. Nichol. (*Canner*, 69, 6, 13-16.)

489. Cacao Butter. Bodinus. (*Pharm. Ztg.*, 74, 647-648.)

490. Composition of Mangolds Grown in Mid-Wales. Fagan and Watkin. (*Welsh J. Agric.*, 4, 102-113.)

491. Diffusion Experiments with Dried Beet Slices. Stanek and Sandera. (*Z. Zuckerind. Czechoslov.*, 53, 525-534.)

492. Keeping Quality of White Sugars. Honig. (*Internat. Sug. J.*, 31, 214.)

493. Storage of Fruit Juices. Joslyn. (*Glass Packer*, 11, 7, 271-274.)

494. Removing Cream of Tartar from Grape Concentrates. Richert. (*Ibid.*, 285.)

Cereal Products

495. The Conditioning of Wheat. Fairbrother. (*Ind. Chem.*, 5, 54, 281-285.)

496. Serological Determination in Ergot in Flour. Okolov and Akinov. (*Z. Unters. Lebensm.*, 57, 72-76.)

497. Detection of Oxygenated Salts in Flour. Neumann and Scheyer. (*Landw. Jahrb.*, 68, suppl. 1, 330-331.)

498. Distinguishing Wheaten Flour and Bread from those of Rye. Wagenaar. (*Z. Unters. Lebensm.*, 57, 37-45.)

499. Rice Husks in Bran and Sharps. Amos. (*Analyst*, 54, 332-333.)

500. Saccharifying and Liquefying Enzymes of Malt. (*Brewers' Jour.*, 769, 359.)

501. Manganese in Cereal Products. Davidson. (*Cereal Chem.*, 6, 128-133.)

502. Phosphorus of Grains. Greaves and Hirst. (*Ibid.*, 115-120.)

503. Determination of Diastatic Activity in Flour. Malloch. (*Ibid.*, 175-181.)

504. Direct Ash Weighing. Liddell. (*Ibid.*, 134-139.)

505. Enzyme Activity in Flour and Wheat. Fairbrother. (*Ind. Chem.*, 5, 55, 313-315.)

Dairy Products

506. "Values" of Fat from Preserved-Milk Products. Fincke. (*Z. Unters. Lebensm.*, 57, 9-13.)

507. Relation of Food to the Composition of Milk. Davies and Provan. (*Welsh J. Agric.*, 4, 114-121.)

508. Gerber's Acid Butyrometric as a Scientific Method of Examination of Milk. Koestler and Loertsher. (*Z. Unters. Lebensm.*, 57, 48-59.)

509. Hoyberg's Method for Determining Fat in Milk and Cream. Burr. (*Landw. Jahrb.*, 68, 179.)

510. Refraction of Milks Low in Solids-not-Fat. Elsdon and Stubbs. (*Analyst*, 54, 318-320.)

511. Water Content of Cheese. Burr. (*Landw. Jahrb.*, 68, suppl. 1, 172-173.)

512. Analytical Differences between Acid and Rennet Caseins. Porcher and Brigando. (*Ann. Falsif.*, 22, 153-163.)

513. Average Composition of Milk. Elsdon. (Annual Report of County Analyst of Lancaster for 1929.)

514. Microscopical Identification of Malted Milk and its Flavoured Products. Hillig and Hartmann. (*J. Offic. Off. Agric. Chem.*, 12, 238-240.)

Various

515. Dampness the Enemy of Tea. (*Glass Container*, 8, 9, 5-8.)

516. Colour Solutions as Sources of Spoilage in Beverages. Beard, Levine and Buchanan. (*Ibid.*, 22-24.)

517. Research and the Confectionery Industry. Harrison Howe. (*Manfg. Conf.*, 9, 7, 38-41.)

518. Refined Dextrose. Krno. (*Ibid.*, 46-49.)

519. Cocoa Chocolate and the Cacao Moth. Whymper. (*Ibid.*, 50-52.)

520. Effect of Hydrogen-Ion Concentration on Mixture of Lactic and Acetic Acid. Lesley. (*Fruit Prod. Jour.*, 8, 11, 14-16.)

521. Characteristics of Edible Gelatine. Masurovsky. (*Manfg. Conf.*, 9, 6, 60-62.)

522. Field Experimentation in the Sugar Industry. Roberts. (*Planter and Sug. Man.*, 83, 4, 61-65.)

523. Jellies and Gels. Kirchhof. (*Kautschuk*, 5, 100-103, 140-142.)

524. Luminescence of Sound Dutch Lard in Ultra-Violet Light. Van Druten. (*Z. Unters. Lebensm.*, 57, 60-62.)

525. Packaging Flesh Products for Quick Freezing. Birdseye. (*Ind. Eng. Chem.*, 21, 573-576.)

526. Comparative Physiology of the Vitamins. Oliver. (*J. Inst. Hyg.*, 108, 8-10.)

527. The Distribution of Vitamin B_2 in certain Foods. Aykroyd and Roscoe. (*Biochem. Jour.*, 23, 3, 483-497.)

528. Processing—Retort Operation (*Canner*, 69, 5, 13-14.)

529. The Superproduction Crisis and the Sugar Industry. Cross. (*Planter and Sug. Man.*, 83, 5, 81-83.)

530. Field Experimentation and the Sugar Industry. (*Ibid.*, 83-84.)

531. Relations between Constitution and Taste of Pungent Principles. Lange, Ebert and Yonse. (*J. Amer. Chem. Soc.*, 51, 1911-1914.)

532. Test for Vitamin A in Margarine, Butter and other Fatty Foods. Andersen and Nightingale. (*J. Soc. Chem. Ind.*, 48, 139-140 T.)

533. Vitamin B Terminology. (*Pharm. J.*, 122, 451.)

534. Zarotschenzeff System of Rapid-Freezing (of Fish). Fox. (*Cold Stor.*, 376, 230.)

535. Refrigeration in the Ice-Cream Industry. Wallis. (*Ibid.*, 227.)

536. Canning Conserves Vitamin Value. Kohman. (*Canner*, 69, 5, 15-16.)

537. Reducing Meat Plant Washing Costs. (*National Provisioner*, 81, 5, 21-22.)

538. Insect Pests of Cocoa and Chocolate. Campbell. (*Conf. Jour.*, Aug., 1929, 45-49.)

Analysis

539. Margarine containing Egg-Yolk. Angerhausen and Schulze. (*Pharm. Zentr.*, 70, 389-392.)

540. Bull's Rapid Method for Determining Fat in Fish. Sebelien. (*Chem. Ztg.*, 53, 489-490.)

541. The Qualitative Detection of Fats and their Components with special reference to Micro Methods. Niethammer. (*Biochemische Zeitschr.*, 209, 447-457.)

542. Detection of Regenerated Preserved Peas. Lüning and Beyer. (*Z. Unters. Lebensm.*, 57, 76-85.)

543. Determination of the Degree of Ripeness of Peas. Lasausse, Guérithault and Pellerin. (*Bull. Sci. Pharmacol.*, 35, 575-579.)

544. Examination of Marzipan. Pritzker and Jungkunz. (*Z. Unters. Lebensm.*, 57, 85-90.)

545. Detection of Prohibited Vegetables and Coal-Tar Colours in Foodstuffs. Nicholls. (*Analyst*, 54, 335.)

546. The Differential Halogen Absorptions of Oils and Fats. Croxford. (*Analyst*, 641, 445-453.)

547. Detection of Apple and other Fruit Juices in Wine. Werder. (*Ann. Falsif.*, 22, 260-261.)

548. Zinc in Sugar Products. Spengler and Zablinsky. (*Z. Ver. deut. Zuckerind.*, 79, 251-262.)

549. Determination of Hydrogen-Ion Concentration in Sugar Manufacture. Kukharenko and Savinov. (*Monograph*, 11, 147.)

550. Hydrogen-Ion Determination in Flour and Bakery Products. Whittier and Grewe. (*Cereal Chem.*, 6, 153-162.)

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

Merchandise Marks Acts

OBLITERATING MARKS

THREE tradesmen were summoned at Brighton for removing or obliterating an indication of origin on certain eggs, contrary to the Merchandise Marks Act, 1906.

Evidence was given by an inspector that, on visiting the warehouse of one of the defendants, he saw a crate containing several hundreds of imported eggs bearing the importation mark of Belgium printed in blue. Near the crate were two pails, one containing water and the other water to which commercial sulphuric acid had been added. One of the defendants was taking eggs from the crate of marked eggs and washing them in the pail containing sulphuric acid, from which they were transferred to the bucket of clean water, near which another of the defendants was standing, so that he could take the washed eggs out and dry them. At the back was a crate containing unmarked English eggs, and another box containing eggs similar to those which had just been washed.

The solicitor for the defence submitted that his clients were fairly entitled to the presumption that the marks on the eggs were washed off accidentally and would have been replaced.

The magistrates found that there was insufficient evidence against one of the defendants, and dismissed the case against him. The other defendants were fined £5 and £2 respectively.

A CHARLES II. ACT

W. S. GILBERT AND "D.O.R.A."

At Hull, the Ideal Confectioners, Ltd., of 50, Whitefriargate, were summoned for selling sweets after 9.30 p.m. on Sunday. An ingenious point was raised by Mr. Witty for the defence. Trading, he admitted, was illegal on Sundays, but a shopkeeper could carry on his usual trade by paying a fine of 5s. In this case, as the defendant had already paid the fine imposed under an Act of Charles II., how could he be fined again? Had Sir W. S. Gilbert been alive to-day he might have written a comic opera on D.O.R.A. in which there would have been a Lord High Sleuth. The case, said the magistrate, was a paltry one—a case where a man was brought before the court for selling four-pennyworth of sweets at a time when he was very busy. It was analogous with the case of a woman recently summoned for selling two-pennyworth of firewood after hours. Some 80 per cent. of the whole of the convictions of the country for prosecutions under the Act of Charles II. were recorded in Hull. It was submitted that a shopkeeper having once been fined for keeping open could not be fined again.

The Clerk pointed out, however, that the 5s. fine had not been paid, and so the magistrate said that that was an end to the ingenious point raised by Mr. Witty. A fine of 10s. 6d. would be imposed.

Artificial Cream Act

THE FIRST CASE

In a case, stated to be the first of its kind, under the Artificial Cream Act, 1929, the Ferns Pure Milk and Cream Co., Ltd., of Howland Street, W.C., were at Marlborough Street Police Court, on August 13, fined £10 2s. and ordered to pay £7 costs. Notice of appeal was given, and Mr. Mead, the magistrate, agreed to state a case.

The company was summoned for selling or offering for sale a substance purporting to be cream or artificial cream without describing it as "artificial," and also for using a receptacle for the conveyance of artificial cream without having the words "artificial cream" on it. Mr. G. B. McClure, prosecuting for the National Farmers' Union, said that artificial cream could not be distinguished by analysis from ordinary cream, and the Act was passed at the instigation of the National Farmers' Union in order that the purchaser might know he was getting artificial cream.

Mr. B. M. Cloutman, who defended, said that the infringement of the Act was only technical. The prosecution was brought within six weeks of the passing of the Act, when things were in a state of transition, and he contended that if the food and drug authority did not see fit to take action that was a complete answer to the summons.

Mr. Mead, who ruled against Mr. Cloutman's contention, said that the Act stated: "It shall be the duty of every food and drug authority to enforce the provisions of this Act," but that did not exclude other persons from taking action. If the food and drug authority was not sufficiently vigilant there was nothing to prevent other people prosecuting.

John Lamont, an employee of the National Farmers' Union, said that he purchased from the company a carton of artificial cream on which there was nothing to indicate that it was artificial cream.

The company's sales manager said that they manufactured artificial cream and sold it to retailers. A supply of labels and cartons complying with the Act was ordered immediately after the Act was published, but for a few days it was necessary to use the old cartons.

Mr. Mead remarked that the name of the company seemed to him to be misleading, as the ordinary person would think that it referred to natural cream and milk. He supposed the Act was passed to protect the interests of farmers in this country. The struggle to make agriculture pay was a severe one. It might be that manufactured cream contained fewer malignant germs than natural cream, but whether that was so or not there was a prejudice in favour of natural cream. The price of ordinary

cream was higher than that of the manufactured article, and therefore he thought that farmers had a perfect right to be protected, as they were protected, by the Act. The Act was no good unless it was enforced, and nobody could complain because, as soon as the Act was passed, the persons interested took care to see that it was not a dead letter. The magistrate added that he did not regard the offence as a technical one.

London Gazette Information

Reduction of Capital.

C. AND E. MORTON, LTD. and Reduced and in the Matter of the Companies (Consolidation) Act, 1908. The Order of the High Court, Chancery Division, dated July 23, 1929, confirming the reduction of the capital of this company from £850,000 to £625,000 and the Minute approved by the Court, showing, with respect to the share capital of the company as altered, the several particulars required by the above Act, were registered by the Registrar of Companies on July 31, 1929. The said Minute is as follows:

"The capital of C. and E. Morton, Limited and Reduced was, by virtue of a Special Resolution and with the sanction of an Order of the High Court of Justice, dated July 23, 1929, reduced from the former capital of £850,000, divided into 450,000 ordinary shares of £1 each, and 400,000 preference shares of £1 each, to £625,000, divided into 450,000 ordinary shares of 10s. each, and 400,000 preference shares of £1 each, the whole of which at the date of registration of this Minute had been issued, and the full amount of 10s. per ordinary share and £1 per preference share was to be deemed to be paid up thereon.

"A Special Resolution of the company has been passed and confirmed by the effect of which upon such reduction of capital being effected and confirmed by the Court the capital of the company is forthwith increased to the former amount of £850,000, by the creation of 225,000 new shares of £1 each to be called preferred ordinary shares."

LIPTON, LTD. and Reduced, and in the matter of the Companies Act, 1908 to 1928. The Order of the High Court, Chancery Division, dated July 15, 1929, confirming the reduction of the capital of this company from £3,250,000 to £1,422,500, and the Minute approved by the Court showing with respect to the capital of the company as altered the several particulars required by the above Statutes was registered by the Registrar of Companies on July 25, 1929.

Voluntary Liquidations.

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

JOSEPH FISON AND COMPANY, LIMITED. Resolved, July 15, confirmed, July 30, that the company be wound up voluntarily, it being expedient to effect an amalgamation with Packards and James Fison (Thetford), Ltd. and Prentice Bros., Ltd. Liquidator: Mr. W. R. Wolton. (Formal notice to comply with Companies Acts. All creditors have been, or will be, paid in full.)

PRENTICE BROS., LIMITED. Resolved, July 15, confirmed, July 30, that the company be wound up voluntarily, it being expedient to effect an amalgamation with Joseph Fison and Co. Ltd. and Packards and James Fison (Thetford), Ltd. Liquidator: Mr. R. E. Fisk, 2, Bridge St., Stowmarket. (Formal notice to comply with Companies Acts. All creditors have been, or will be, paid in full.)

LONDON CRISP COMPANY, LIMITED (in voluntary liquidation). Resolved, July 22, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. W. T. Flower, C.A., 19, St. George's Rd., Wimbledon, S.W.19, be appointed liquidator.

CREAM OF CEREALS, LIMITED. Resolved, July 15, that the company cannot, by reason of its liabilities, continue its business; that it be wound up voluntarily, and that Mr. J. C. Knowles, of Midland Bank Chambers, Letchworth, be appointed liquidator.

HEDGE'S BREWERY COMPANY, LIMITED. Resolved, July 26, confirmed, August 9, that the company be wound up voluntarily, and that Mr. E. Cross, C.A., 36, St. Mary's Gate, Derby, be appointed liquidator. Claims should be sent to the liquidator by September 23.

New Companies

COCOA ASSOCIATION OF LONDON, LIMITED. (240145.) To promote, protect, and regulate trade in raw cocoa and kindred articles in the U.K. and elsewhere, etc. Nom. Cap.: £10,000.

CROSS FARM DAIRIES, LIMITED. (240172.) Cross Farm, Hadleigh, Essex. To take over the bus. of a cowkeeper, dairyman, and vendor of dairy produce, etc., cd. on at Hadleigh by W. R. R. Bridge. Nom. Cap.: £6,000.

THOMAS VANE, LIMITED. (240300.) To take over the bus. of a grocer and provision mcht. cd. on at Tonbridge, Kent, by J. Vane, as executor of T. Vane. Nom. Cap.: £6,000.

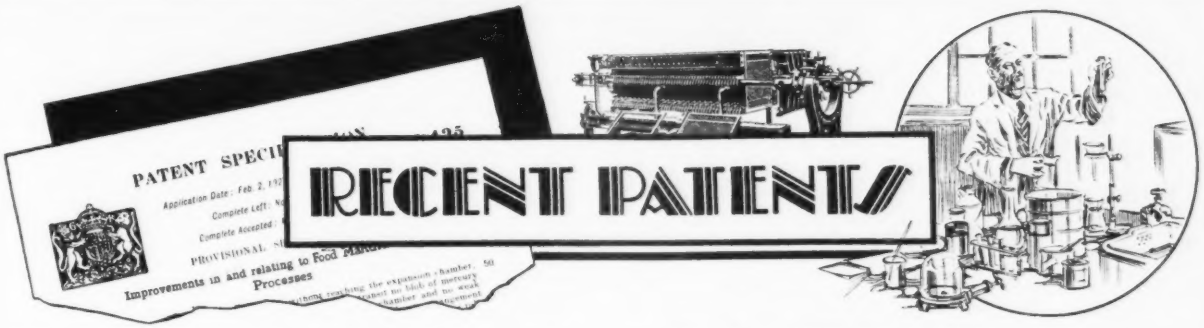
ADELPHI CONFECTIONERY COMPANY, LIMITED. (240305.) Liston Street. Sewell Street, Balaam Street, Plaistow, E. 1. To take over the bus. of a mnfg. confectioner cd. on at Plaistow by H. Hofmeister. Nom. Cap.: £1,000.

SUTTON'S WHOLESALE FRUIT COMPANY, LIMITED. (240407.) Parkers Croft, Stafford. To take over the bus. of wholesale vegetable and fruit dlrs. cd. on at 7, Ingestere Road, Stafford, by Sutton and Company. Nom. Cap.: £2,000.

TOMASSO BROTHERS, LIMITED. (240470.) 93, Jack Lane, Hunslet, Leeds. To take over the bus. of ice-cream mnfrs. cd. on at Hunslet as "Tomasso Bros." Nom. Cap.: £500.

CREMALT, LIMITED. (240476.) Albion Mills, Tatbank Road, Oldbury. To carry on the bus. of flour millers, bakers, and confectioners, biscuit manufacturers, bread improvers, etc. Nom. Cap.: £5,000.

RUBY CATERERS, LIMITED. (240490.) 62, Kenneth Road, Chadwell Heath, Essex. To carry on the bus. of bakers, pastrycooks, confectioners, caterers, restaurateurs, etc. Nom. Cap.: £200.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications.

22449. SIDDALL, T. A.: Machine for extracting oils from citrus fruits. July 22.

22499. BEACH, A. W.: Manufacture of jams, etc. July 22.

22563. HAMILTON, R.: Machines for grading eggs, etc. July 23.

22912. DICKINSON AND CO., LTD., J. AND ELLENS, W. E.: Wrappers for meat carcases. July 25.

23130. BACKER, P. DE: Preparing green coloured preserved vegetables. July 27.

Specifications Published.

302,313. HOLZHYDROLYSE AKT.-GES.: Manufacture of wood sugar.

312,036. SIPPEL, O. A.: Food products and process of production.

315,462. SCHOLLER, DR. H.: Process of and apparatus for converting cellulose and the like into sugar.

316,815. DUNNETT, H.: Food safes.

316,850. GALBANI, E.: Food product.

Abstracts Published.

312,705. **Sugar solutions.** WOOLDRIDGE, H. B., 2, Glenhurst Avenue, and CLARKE, P. G., 183, Oakwood Court, both in London.

Purifying saccharine liquids.—Beet and cane sugar in the form of low grade syrup containing invert sugar —*e.g.*, molasses, are purified particularly for use in the production of a white yeast but also for other purposes. The molasses or sugar liquor is passed as a thin syrup through an ordinary cloth filter press coated with any filter aid, preferably that known as "Celite," "Super Cell" or "Hyflo." The solution is then allowed to percolate through precipitated alumina, the trihydrate or one of the various forms of bauxite, or magnesium hydrate. In the case of many cane syrups it is necessary to defecate the weak syrup by boiling it with weak phosphoric acid and neutralising with lime water before passing it through the filter. The Provisional Specification states that bauxite may be replaced by other filtering media such as activated carbon or char. Specification 134,607 is referred to.

312,768. **Extracting oils.** WILLIAMS, W. P., 24, Southampton Buildings, London.

In the extraction of oil from fish livers, fresh or salt livers are pulverised and heated at 42° to 45° C. for 10 to 24 hours, the liver cells being broken down by the autolytic action of the ferments inherently contained. Oil is separated from the residue by decanting, filtering or centrifuging, and by extraction with water. The residue constitutes a degras for leather dressing.

312,771. **Delivering granular substances in measured quantities.** WHITE, G. B., 51, Court Road, Cardiff.

Approximately correct quantities of sugar, etc., are delivered from a hopper into bags placed over the end of a tube. A sliding door in the base of the hopper is opened by a treadle through the medium of a chain and is closed on the release of the treadle by springs. The tube is held in adjusted position by a lock-nut. Baffles consisting of cones or pyramids with a third cone or pyramid between them, but oppositely directed promote the even flow of the material.

310,022. **Centrifugal pumping machines.** AMERICAN MANGANESE STEEL COMPANY, 332, South Michigan Avenue, Chicago, U.S.A.—(Assignees of Nagle, P. I.; 1344, Vincennes Avenue, Chicago, U.S.A.)

310,271. **Opening eggs.** PLENTY, J. J., 3, Station Road, Ashley Down, Bristol.

310,369. **Crystallising sugar.** BARATIER CORPORATION, 82, Wall Street, New York, U.S.A.—(Assignees of Spreckels, C. A.; Ritz-Carlton Hotel, 47th Street, New York, U.S.A.)

Saccharine solutions, concentrating and crystallising.—Large symmetrical sugar crystals are obtained by blowing air or other gas through sugar liquor, thereby causing vigorous agitation of the liquor and evaporation of water. Crystallisation may be aided by the addition of small sugar particles. Fresh sugar liquor is added as the crystals grow. The temperature is kept below the caramelisation point.

310,407. **Bakers' ovens, etc.** KEMP MANUFACTURING COMPANY, Inc., C. M.—(Assignees of Kemp, W. W.; 405e, Oliver Street, Baltimore, U.S.A.)

310,470. **Foodstuff containers.** BRACEY, H. E. P., Wenvoe, Ordnance Avenue, Lithgow, New South Wales, Australia.

310,920. **Bakers' ovens.** VICARS, LIMITED, T. AND T., and CROSLAND, E. M., Earlestown, Newton-le-Willows, Lancashire.

310,542. **Extracting fats, etc.** SOMMERMEYER, A., Kanalstrasse, Rudow, Berlin.

311,361. **Casting chocolate.** MARKS, E. C. R., 57, Lincoln's Inn Fields, London.

The known process of casting chocolate into plates or bars in which moulds on an endless carrier, which are charged with the molten material, are passed through a cooling chamber before solidified contents are removed, is modified by cooling "relatively rapidly at a substantially uniform rate" to such a point that the material contracts relatively to the metal mould and thus can be removed readily therefrom without breakage. In the preferred method for producing plates of one-eighth of an inch in thickness, a three-stage cooling is adopted. The moulds, charged with material at about 85° F., spend about four minutes in traversing a chamber maintained at 55° F., during which solidification occurs, and finally spend another four minutes in traversing a low temperature chamber, during which the relative contraction occurs to permit ready detachment from the walls of the mould.

311,034. **Maturing flour.** DUNHAM, R. W., 428, Romford Road, Forest Gate, London.

Treatment by heating and cooling; treating with air; treating with radiation.—Flour is artificially matured by subjecting it to alternate periods of light and comparative heat and darkness and comparative cold. The upper temperature is preferably just under 100° F., and should not exceed 140° F., and the cool temperature is about 50° to 60° F. The heating is preferably accomplished by passing the flour under electric lamps, the filaments of which are heated to a red glow.

311,121. **Maturing grain, flour, etc.** DUNHAM, R. W., 428, Romford Road, Forest Gate, London.

311,665. **Refining oils.** KERNOT, J. C., Imperial College of Science and Technology, South Kensington, London.

Fish oils are deacidified and bleached by acting thereon below 100° C. with aqueous caustic alkali solution, separating the aqueous layer, washing the oil agitating it with concentrated aqueous sulphur dioxide or like sulphurus bleaching treatment if necessary, and again washing. In an example, 0·5 ton of dog-fish oil is stirred into 112 lbs. of a 5 per cent. solution of caustic soda previously heated to 90° C. The emulsion is allowed to stand for twenty-four hours, when the lower aqueous layer is run off. The upper layer is washed with hot water, treated with an equal volume of a saturated solution of sulphur dioxide, washed with hot water, and dried and filtered with fuller's earth, animal charcoal, or other suitable decoloriser. Further bleaching may be effected by hydrogenating below 200° C., preferably in presence of a catalyst consisting of a mixture of the hydrated oxides of nickel and aluminium.

311,877. **Preserving eggs.** STEWART, A. V., and FARMA CREAM PRODUCT COMPANY, LIMITED, 1, Brixton Road, London.

Eggs are preserved by giving them an impervious coating by treatment with a solution containing about 8 per cent. of celluloid dissolved in about 92 per cent. of monoethyl glycol. The coating may be applied in overlapping sections by dipping or spraying, and a colouring matter, which may be of evanescent nature, may be added to the solution to enable uncovered portions to be detected. In another form, the eggs may be caused to roll transversely across a moving table or band so that they pick up the solution either from the surface over which they roll or from pads or brushes located above it, or the solution may be applied by spraying. The eggs may be dried by a current of air. Imperfectly covered eggs are returned for a second treatment.

311,979. **Sugar solutions.** CROSS, E. J., 10, New Court, Lincoln's Inn, London.

A sugar solution suitable for the manufacture of yeast as well as for other purposes is obtained by acid saccharification of the solid constituents of roots of the manihot plant, from which a substantial proportion of the constituents of the amniotic fluid of said roots has been removed. The roots are washed, pressed, dried, mixed with dilute acid, and heated. The solution may be neutralised with ammonia if it is to be used for the production of yeast or alcohol, or glucose may be obtained therefrom.

312,036. **Honey.** SIPPEL, O. A., Bozeman, Montana, U.S.A.

A food product is obtained by grinding, whipping, and aerating granulated, crystallised, or candied honey to a fluffy condition.

The honey is passed from a hopper by a rotating grinder and conveyor to an auxiliary chamber, in which it is ground and aerated between discs and passes to an outlet.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

MYRA

495,099. **Jams.** ROSELLA PRESERVING AND MANUFACTURING COMPANY, LIMITED, 64, Balmain Street, Richmond, State of Victoria, Australia. Aug. 14.

MALTOL

502,321. **Flour, salt, yeast, mixtures of malt and milk powder, and baking powder, all for use as ingredients in the making of bread and cakes.** THE EXPRESS YEAST COMPANY, LIMITED, 3, Northampton Street, Clerkenwell, London, E.C.1. August 7.

MAID OF HONOUR

502,557. **Butter.** RATHKENNY AGENCY, LIMITED, Ulster Model Creameries, Ballymena Road, Rathkenny, Co. Antrim, Ireland. August 14.

ROBBIE

504,368. **Fish.** MAC FISHERIES, LIMITED, Lever House, Victoria Embankment, Blackfriars, London, E.C.4. August 7.